Canada-Ontario Agreement
on Great Lakes Water Quality and Ecosystem Health

2014



Canada

Ontario

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Canada-Ontario Agreement
on Great Lakes Water Quality and Ecosystem Health, 2014

THIS AGREEMENT IS EFFECTIVE THE 18TH DAY OF DECEMBER, 2014

BETWEEN

HER MAJESTY THE QUEEN IN RIGHT OF CANADA (CANADA)

Represented By

The Honourable Leona Aglukkaq, Minister of the Environment (and Minister Responsible for Parks Canada Agency)
The Honourable Gerry Ritz, Minister of Agriculture and Agri-Food
The Honourable Gail Shea, Minister of Fisheries and Oceans
The Honourable Rona Ambrose, Minister of Health
The Honourable Greg Rickford, Minister of Natural Resources
The Honourable Lisa Raitt, Minister of Transport
The Honourable Denis Lebel, President of the Queen's Privy Council for Canada, Minister of Infrastructure, Communities and Intergovernmental Affairs

AND

HER MAJESTY THE QUEEN IN RIGHT OF ONTARIO (ONTARIO)

Represented By

The Honourable Glen R. Murray, Minister of the Environment and Climate Change
The Honourable Bill Mauro, Minister of Natural Resources and Forestry
The Honourable Jeff Leal, Minister of Agriculture, Food and Rural Affairs

WHEREAS Canada and Ontario (the Parties) affirm that this Agreement is guided by the shared vision of a healthy, prosperous and sustainable Great Lakes for present and future generations;

AND WHEREAS the Parties recognize that the Great Lakes region is home to approximately 33 percent of Canada's population, and contains seven of Canada's twenty largest cities, and the Great Lakes directly provide drinking water to over 10 million residents of Ontario;

AND WHEREAS the Parties acknowledge that the Great Lakes region plays a vital role in the physical, social and economic life of Canada, Ontario's Great Lakes basin contains 40 percent of the country's economic activity, including approximately 25 percent of Canada's agricultural production, and more than 75 percent of Canada's manufacturing activity;

AND WHEREAS environmentally sustainable and responsible economic activity, resource development, and innovation is important to the long-term prosperity of the Great Lakes region;

AND WHEREAS the Parties acknowledge that the Great Lakes contain approximately 20 percent of the surface freshwater in the world, and that less than 1 percent of the water is renewed annually by precipitation;

AND WHEREAS the Parties have shared jurisdiction over the Great Lakes, which makes coordination and cooperation essential to their restoration, protection and conservation, and acknowledge that Ontario has the longest coastline of any jurisdiction on the Great Lakes;

AND WHEREAS the Parties acknowledge that the Great Lakes are ecologically important, supporting outstanding biological diversity and significant fisheries;

AND WHEREAS the Parties acknowledge the close connection between Great Lakes water quality and human health and the positive effects on individuals and communities from the use and enjoyment of healthy Great Lakes;

AND WHEREAS since 1971 the Parties have worked together through a series of Canada-Ontario Agreements that have guided their efforts to improve water quality and ecosystem health of the lakes, and contributed to meeting Canada's obligations under the Canada-United States Great Lakes Water Quality Agreement;

AND WHEREAS the efforts of the Great Lakes community contribute to the restoration, protection and conservation of the Great Lakes;

AND WHEREAS the Parties acknowledge that First Nations and Métis within the Great Lakes basin value their spiritual and cultural relationship with the Great Lakes, and that their traditional knowledge may assist efforts to restore, protect and conserve the Great Lakes;

AND WHEREAS the Parties recognize that progress has been made in the Great Lakes in reducing the release of harmful pollutants, improving and protecting fish and wildlife habitat, restoring a number of Areas of Concern, and fostering a sense of stewardship;

AND WHEREAS the Parties recognize that, despite the progress made, the Great Lakes are currently exhibiting symptoms of stress due to human activities undertaken within the basin and elsewhere in the world;

AND WHEREAS the Parties recognize the need to strengthen efforts to address new and continuing threats to Great Lakes water quality and ecosystem health, including aquatic invasive species, excessive nutrients, harmful pollutants, discharges from vessels, climate change, and the loss of habitats and species;

AND WHEREAS the Parties recognize that in addition to offshore waters, nearshore areas must be restored, protected and conserved because they are the major source of drinking water for communities, are where most human commerce and recreation occur, and are the critical ecological link between watersheds and the open waters of the Great Lakes;

AND WHEREAS the Parties acknowledge that the vast majority of public stormwater and wastewater treatment infrastructure in Canada is owned, operated and maintained by provincial, territorial or municipal governments and that those governments are therefore also responsible for identifying priority actions and projects within their jurisdictions;

AND WHEREAS the Parties acknowledge that the federal Wastewater Systems Effluent Regulations, 2012, establish national effluent quality standards for secondary wastewater treatment in Canada;

AND WHEREAS the Parties recognize that restoration and enhancement of Great Lakes water quality and ecosystem health cannot be achieved by addressing individual threats in isolation, but rather depend upon the application of an ecosystem approach that addresses individually and cumulatively all sources of stress to the Great Lakes;

AND WHEREAS the Parties acknowledge that Canada is responsible for meeting its binational commitments in the Canada-United States Great Lakes Water Quality Agreement, and Ontario agrees to support Canada in the manner set out in this Agreement;

AND WHEREAS the Parties acknowledge that the quality of the waters of the Great Lakes may affect the quality of the waters of the St. Lawrence River downstream of the international boundary;

AND WHEREAS the Parties affirm their commitment to work together to implement the Canada-United States Great Lakes Water Quality Agreement and advance the environmental goals of Ontario's Great Lakes Strategy in a manner consistent with the vision and purpose of this Agreement;

AND WHEREAS the Parties are committed to continuing to work together, and to engaging the Great Lakes community on a good governance basis, to restore, protect and conserve the Great Lakes for present and future generations.

NOW THEREFORE the Parties have agreed as follows:

ARTICLES

ARTICLE I

DEFINITIONS

In this Agreement:

(a) "Agreement" means the Canada-Ontario Agreement on Great Lakes Water Quality and Ecosystem Health, 2014, including any Annexes;

(b) "Canada-United States Great Lakes Water Quality Agreement" means the Great Lakes Water Quality Protocol of 2012 between Canada and the United States;

(c) “Chemicals of Concern” means chemicals which Canada and Ontario agree are of concern to human health or the environment in the Great Lakes and should be considered a priority for specific action(s). A Chemical of Concern could be considered for nomination under the Chemicals of Mutual Concern Annex of the Canada-United States Great Lakes Water Quality Agreement;

(d) “Good Governance” means pursue a decision-making process based on public participation, transparency and accountability;

(e) “Great Lakes” means the waters of Lakes Superior, Huron, Michigan, Erie and Ontario and the connecting river systems of St. Marys, St. Clair including Lake St. Clair, Detroit, Niagara and St. Lawrence at the international boundary or upstream from the point at which this river becomes the international boundary between Canada and the United States, including all open and nearshore waters;

(f) “Great Lakes Basin Ecosystem” means the interacting components of air, land, water and living organisms, including humans, and all of the streams, rivers, lakes, and other bodies of water, including groundwater, that are in the drainage basin of the Great Lakes and the St. Lawrence River at the international boundary or upstream from the point at which this river becomes the international boundary between Canada and the United States;

(g) “Great Lakes community” means First Nations and Métis; municipal governments; conservation authorities; non-government organizations; the scientific community; the industrial, agricultural, recreational, tourism and other sectors; and members of the public with an interest in Great Lakes issues;

(h) “Harmful Pollutants” are chemicals or pathogens that have an adverse effect on human or ecological health including, but not restricted to, chemicals of concern or substances of emerging concern;

(i) “Ontario’s Great Lakes Strategy” means the 2012 document that maps out the Province of Ontario’s priorities and plans for action to restore, protect and conserve the Great Lakes.

ARTICLE II

PURPOSE

1. The purpose of this Agreement is to restore, protect and conserve Great Lakes water quality and ecosystem health in order to assist in achieving the vision of a healthy, prosperous and sustainable region for present and future generations.

2. The Parties commit to continuing to work together in a cooperative, coordinated and integrated fashion, with each other and with others around the Great Lakes on a good governance basis, to achieve the vision.

3. To achieve the vision, the Agreement:

   (a) establishes principles that will guide the actions of the Parties;

   (b) describes the development of Annexes to respond to existing or emerging environmental issues;

   (c) sets in place administrative arrangements for the effective and efficient management of the Agreement;

   (d) establishes common priorities, goals, results and commitments for the restoration, protection and conservation of the Great Lakes; and

   (e) establishes a commitment to report on the progress being made in achieving the goals and results of the Agreement, to be aligned with the three-year binational reporting requirements established under the Canada-United States Great Lakes Water Quality Agreement.

4. By defining a vision for the Great Lakes, specific goals and results, and the commitment to action by the Parties, this Agreement is intended to give momentum to wider efforts and to facilitate collaborative arrangements and collective action among all people and organizations with an interest in the Great Lakes.

5. Implementation of this Agreement will contribute to meeting Canada's obligations under the Canada-United States Great Lakes Water Quality Agreement and Ontario’s Great Lakes Strategy.

ARTICLE III

PRINCIPLES

The following principles will guide the actions of the Parties under the Agreement:

(a) Accountability – remain accountable to citizens by establishing clear goals, results and commitments for this Agreement and reporting regularly on progress in relation to environmental conditions;

(b) Adaptive Management – conduct activities with openness, innovation and a view to continuous improvement to ensure effective and efficient management of the Agreement;

(c) Collaboration, Cooperation and Engagement – ensure that the decision-making process provides the Great Lakes community with meaningful opportunities to discuss, advise and participate directly in activities that support the Agreement, and incorporates consideration of opinions and advice from the Great Lakes community;

(d) Communication – ensure that effective methods are used to inform the public of the importance of the Great Lakes, the increasingly complex environmental challenges faced by the Great Lakes and ongoing efforts to overcome the challenges, and to encourage collaborative and individual action and stewardship to restore, protect and conserve the Great Lakes;

(e) Conservation – promote the conservation and wise use of energy, water and other resources to sustain the physical, chemical and biological integrity of the Great Lakes;

(f) Cumulative Effects – consider the combined impacts of individual actions on the environment;

(g) First Nations and Métis – their identity, cultures, interests, knowledge and traditional practices will be considered by the Parties in the restoration, protection and conservation of the Great Lakes Basin Ecosystem;

(h) Free Exchange of Information – collect data once, closest to the source, in the most efficient manner possible and share the information with others;

(i) Net Gain – design human development and management actions to maximize environmental benefits rather than acting only to minimize environmental costs;

(j) Polluter Pays – recognize that the polluter should bear the cost of pollution;

(k) Pollution Prevention – use processes, practices, materials, products, substances or energy that avoid or minimize the creation of pollutants and waste and reduce the overall risk to the environment or human health;

(l) Precautionary Principle – where there are threats of serious or irreversible environmental damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation;

(m) Science-Based Management – provide advice to establish management priorities, policies and programs based on best available science, research and knowledge, including traditional knowledge when available;

(n) Sustainability – consider social, economic and environmental demands to balance the needs of the present without compromising the ability of future generations to meet their own needs;

(o) Virtual Elimination – adopt the principle of virtual elimination of Chemicals of Concern, as appropriate; and

(p) Zero Discharge – apply the philosophy of zero discharge of releases of Chemicals of Concern, as appropriate.

ARTICLE IV

ANNEXES

1. The Parties agree to develop and implement Annexes that focus on environmental issues that are a priority for the Parties and will benefit from cooperative and coordinated action.

2. Through this Agreement, Canada and Ontario provide specific goals, results and commitments to work together and with the Great Lakes community on a good governance basis to restore, protect and conserve water quality and ecosystem health in the Great Lakes. They are addressed in fourteen Annexes, which are grouped under five priorities:

   Protecting Waters
   1. Nutrients
   2. Harmful Pollutants
   3. Discharges from Vessels

   Improving Wetlands, Beaches and Coastal Areas
   4. Areas of Concern
   5. Lakewide Management

   Protecting Habitat and Species
   6. Aquatic Invasive Species
   7. Habitat and Species

   Enhancing Understanding and Adaptation
   8. Groundwater Quality
   9. Climate Change Impacts
   10. Science

   Promoting Innovation and Engaging Communities
   11. Promoting Innovation
   12. Engaging Communities
   13. Engaging First Nations
   14. Engaging Métis

3. Each Annex specifies:

   (a) goals for the Great Lakes specific to the subject of the Annex, and that, in the opinion of the Parties, are the long-term articulation of what both Parties will strive to achieve;

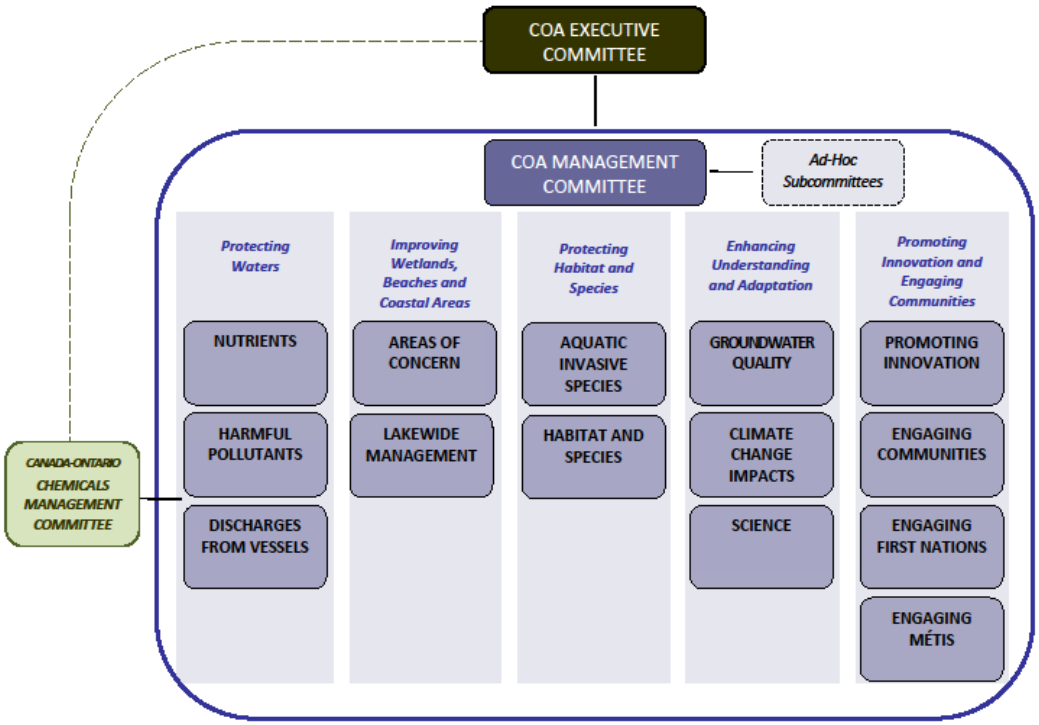
   (b) results that the Parties will pursue in order to contribute towards the achievement of the stated goals; and

   (c) commitments that each of the Parties will deliver jointly or separately for the duration of the Annex in order to contribute to the achievement of the stated goals and results.

4. Annexes may be developed at any time, and will come into force upon signing by the Parties. The Parties commit to engaging the Great Lakes community on a good governance basis as appropriate when developing or amending Annexes.

ARTICLE V

ADMINISTRATION OF THE AGREEMENT



COA EXECUTIVE COMMITTEE

1. The oversight of the Agreement will be entrusted to the COA Executive Committee. The Committee will consist of Assistant Deputy Ministers, Regional Director Generals or most senior regional representatives from all departments, ministries and agencies of the Parties who are responsible for leading or supporting one or more commitments in any of the Annexes. The Committee will be co-chaired by Environment Canada and the Ontario Ministry of the Environment and Climate Change.

2. Canada will invite the Ontario members of the COA Executive Committee to participate on the Canada-United States Great Lakes Executive Committee pursuant to Article 5 of the Canada-United States Great Lakes Water Quality Agreement. The COA Executive Committee will convene discussions prior to meetings of the binational Great Lakes Executive Committee to review and advise on issues to be raised at the meetings.

3. Canada will invite Ontario to participate on appropriate Annex-specific subcommittees to the Canada-United States Great Lakes Executive Committee, as required, to assist in the implementation of the Great Lakes Water Quality Agreement pursuant to Article 5 of that Agreement.

4. The COA Executive Committee will be responsible for:

   (a) setting priorities on an annual basis to ensure the achievement of the goals, results and commitments of the Agreement;

   (b) undertaking annual evaluations and assessments of the Agreement and recommending amendments and/or action to facilitate progress as appropriate;

   (c) facilitating strategic discussions on issues such as infrastructure, science and innovation between signatory and non-signatory departments, ministries and agencies of the Parties and others to ensure the effective coordination of actions;

   (d) overseeing periodic strategic assessments of current and emerging issues and addressing the implications to the Agreement;

   (e) overseeing the development, amendment and implementation of Annexes;

   (f) reviewing science priorities on an annual basis;

   (g) overseeing the Great Lakes specific work of the Canada-Ontario Chemicals Management Committee;

   (h) overseeing the delivery of communications and reporting to the Great Lakes community on progress and activities under the Agreement in a timely manner;

   (i) ensuring opportunities for engagement and cooperation with the Great Lakes community to facilitate increased collaborative action on Great Lakes priorities;

   (j) holding roundtable discussions, as appropriate, with invited representatives of relevant domestic Great Lakes bodies or jurisdictions that have an interest in the management of the Great Lakes and representatives of the Great Lakes community, including downstream interests along the St. Lawrence River;

   (k) developing common positions for representing Canadian interests and engaging in cooperative initiatives with United States agencies and the International Joint Commission; and

   (l) making every effort to ensure that there are strong linkages and open communications among members of the COA Executive Committee and with other Great Lakes

governance bodies that have a role or mandate addressing Great Lakes issues or that could have an impact on the commitments under this Agreement.

COA MANAGEMENT COMMITTEE

5. The implementation of the goals, results and commitments over the five-year work cycle will be entrusted to the COA Management Committee. The Committee will include: a co-chair from Environment Canada and co-chair from the Ontario Ministry of the Environment and Climate Change; the leads of each Annex; and the Chairs of the Canada-Ontario Chemicals Management Committee or their designate.

6. The COA Management Committee will be responsible for:

   (a) coordinating and managing the implementation actions of the Parties to ensure effective, efficient and timely implementation and achievement of Agreement goals, results and commitments;

   (b) seeking opportunities for enhanced cooperation, collaboration and integration of activity between the Parties and the Great Lakes community to achieve the goals, results and commitments of the Agreement;

   (c) recommending action to the COA Executive Committee when authority or policy direction is required to effectively achieve the goals, results and commitments of the Agreement;

   (d) monitoring progress against the goals, results, and commitments and presenting it to the COA Executive Committee for review; and

   (e) convening subcommittees of federal and provincial representatives and the Great Lakes community as appropriate to examine emerging issues and advise on particular activities, projects and events, as required.

ANNEX LEADS

7. To manage the implementation of each Annex, the Parties will identify federal-provincial leads as needed for:

   (a) overseeing Annex-specific coordination, cooperation and integration of activities, including the establishment of Annex teams as needed;

   (b) coordinating implementation of multi-year work plans and undertaking an annual assessment of work plan progress for review and approval by the COA Management Committee. Every effort will be made to ensure a coordinated and cooperative approach by maximizing the integration of activities of contributing departments, ministries, agencies and others;

   (c) recommending a course of action to the COA Management Committee when more authority or policy direction is required to achieve the goals, results and commitments of the Agreement; and

   (d) ensuring opportunities for engagement, participation and cooperation with the Great Lakes community as appropriate in the delivery of Annex commitments.

ARTICLE VI

REPORTING

The Parties agree to report jointly on progress made under the Agreement in a manner that generally aligns with reporting requirements under the Canada-United States Great Lakes Water Quality Agreement and Ontario's Great Lakes Strategy.

ARTICLE VII

RESOURCES

The Parties commit to providing the resources needed to implement the Agreement and the Annexes pursuant to it, subject to there being an appropriation for such purposes in Parliament or the Legislature, as the case may be, in the relevant fiscal year. The Parties agree to create opportunities for others to contribute resources, as appropriate, to achieving the Purpose of the Agreement.

ARTICLE VIII

NOTIFICATION

1. Prior to undertaking any changes to the Canada-United States Great Lakes Water Quality Agreement, Canada will consult with Ontario.

2. Prior to undertaking any activities with the United States that may significantly affect this Agreement, Canada will notify Ontario.

3. Prior to undertaking any agreement with States of the United States that may significantly affect this Agreement, Ontario will notify Canada.

4. The Parties agree to continue to cooperate in anticipating, preventing and responding to threats to the Great Lakes. The Parties agree to facilitate the exchange of information using existing mechanisms to provide notice of any proposed activity that could have a significant impact on the waters of the Great Lakes.

ARTICLE IX

AMENDING THE AGREEMENT

The Agreement may be amended by the Parties at any time. The Parties commit to engaging the Great Lakes community, as appropriate, when amending the Agreement. An amendment will be confirmed by an exchange of letters by the Parties setting out the amendment and the date it enters into force.

ARTICLE X

DISPUTE AVOIDANCE

1. The Parties are committed to working collaboratively to avoid and resolve any dispute concerning the management of the Agreement and the performance of obligations set out in the Annexes.

2. The Agreement's Executive Committee will make all reasonable efforts to resolve any dispute under this Agreement.

3. In the event that a dispute under the Agreement is not resolved by the Executive Committee, either Party may provide written notice to the other Party of the matter in dispute together with related information and documentation requesting further efforts by the Parties to resolve the matter. In that event, within 60 days of notice, the Parties will meet to discuss the dispute in a cooperative and collaborative manner. If the dispute is not resolved within 60 days of the meeting, or such longer period as the Parties may agree, the Parties may jointly retain a third party to provide mediation in connection with the resolution of the dispute.

ARTICLE XI

ENTRY INTO FORCE

This Agreement will enter into force on December 18, 2014, and will remain in force for five years, until December 17, 2019. The Agreement may be terminated earlier by either Party giving the other at least six months written notice.

ARTICLE XII

COMPLIANCE WITH LAW

1. Nothing in this Agreement alters the legislative or other authority of the Parties with respect to the exercise of their legislative or other authorities under the Constitution of Canada.

2. The Parties acknowledge that the obligations in this Agreement are subject to the applicable laws of Canada and Ontario.

ORIGINAL SIGNED BY

ON BEHALF OF HER MAJESTY THE QUEEN IN RIGHT OF CANADA

Minister of the Environment (and Minister Responsible for Parks Canada Agency)
Minister of Agriculture and Agri-Food
Minister of Fisheries and Oceans
Minister of Health
Minister of Natural Resources
Minister of Transport
President of the Queen's Privy Council for Canada, Minister of Infrastructure, Communities and Intergovernmental Affairs

ON BEHALF OF HER MAJESTY THE QUEEN IN RIGHT OF ONTARIO

Minister of the Environment and Climate Change
Minister of Natural Resources and Forestry
Minister of Agriculture, Food and Rural Affairs

PRIORITY – PROTECTING WATERS

This Priority focuses on understanding and reducing excessive nutrients, reducing or eliminating releases of harmful pollutants and protecting the Great Lakes from discharges from vessels in order to protect human and aquatic ecosystem health and well-being. Clean water is the foundation for healthy Great Lakes ecosystems, but is threatened by various sources of pollution and the adverse effects of this pollution are exacerbated by climate change. To address these issues, this Priority includes Annexes on Nutrients, Harmful Pollutants and Discharges from Vessels.

ANNEX 1: NUTRIENTS

The purpose of this Annex is to address the issue of excess nutrients and reduce harmful and nuisance algal blooms.

There is an urgent need for a coordinated and strategic response to nutrient management issues in the Great Lakes, and in Lake Erie in particular. In the 1970s and 1980s, collaborative efforts to reduce phosphorus were successful and lake conditions improved. By 1985, phosphorus loadings into the Great Lakes were at or below targets identified in the Canada-United States Great Lakes Water Quality Agreement. However, since the mid-1990s there has been a resurgence of algal blooms in Lake Erie and the nearshore areas of Lakes Huron and Ontario.

The reasons for the occurrence of algal blooms are now more complex than in past decades. The introduction of invasive species such as zebra and quagga mussels and round gobies, changes in agricultural production systems, increased urbanization, and climate change are all contributing factors. New solutions are required.

The Great Lakes are currently experiencing nutrient levels that impair human use and also result in harmful effects on ecosystem functions. This Annex recognizes that the continued environmental, social and economic health of the Great Lakes basin requires the effective and efficient management of nutrients from human activities. It addresses the need for improved understanding of nutrient issues while continuing to develop and promote actions to improve nutrient management and to reduce inputs from wastewater and stormwater.

Actions to understand and address issues related to nearshore water quality, aquatic ecosystem health, and harmful and nuisance algae will continue for all the Great Lakes. However, early efforts will be focused on the nearshore and open waters of Lake Erie, and on priority watersheds. This focus on Lake Erie will address the lake at greatest risk and maximize returns on investment while generating scientific data and policy approaches that may be transferable to the other Great Lakes and potentially to aquatic ecosystems elsewhere in Canada.

There are a number of complementary initiatives that contribute to the goal of reducing harmful and nuisance algal blooms in the Great Lakes. These include federal and provincial investments in nutrient related research and monitoring; green infrastructure, wastewater technologies and facilities upgrades; and improvements in urban and rural land use and land management practices. Working with the Great Lakes community, this Annex strives towards the long-term goal of attaining the sustainable use of nutrients for the continued health and productivity of the Great Lakes ecosystem and economy. Specific commitments are provided to enhance the scientific understanding of nutrient dynamics, develop phosphorus targets and action plans, reduce nutrient inputs from urban and rural stormwater and wastewater, and increase the efficiency of agricultural nutrient use consistent with a healthy Great Lakes ecosystem and economy. Commitments in other Annexes including Lakewide Management, Climate Change Impacts and Promoting Innovation also contribute to reducing excessive nutrients.

GOAL 1: IMPROVE UNDERSTANDING OF NUTRIENT REQUIREMENTS AND ENVIRONMENTAL CONDITIONS NEEDED TO MAINTAIN ALGAL POPULATIONS CONSISTENT WITH A HEALTHY GREAT LAKES ECOSYSTEM.

Result 1.1 – *Improved understanding of sources, transport and fate of nutrients in the Great Lakes, with an emphasis on Lake Erie*.

Canada and Ontario will:

(a) Improve knowledge and understanding of nutrient concentrations and loadings in Great Lakes tributary discharges, with an emphasis on Lake Erie tributaries;

(b) Improve knowledge and understanding of phosphorus sources, the forms of phosphorus being discharged to the Great Lakes, and their seasonal characteristics; and

(c) Enhance information on land use, soil and management practices relevant to excess phosphorus in the Great Lakes, with specific emphasis on Lakes Erie and Huron.

Ontario will:

(d) Conduct sub-watershed and field scale research to support the ongoing development and implementation of new approaches and technologies for the reduction of phosphorus from agricultural sources;

(e) Investigate the contribution of natural heritage features to reducing excess phosphorus from rural and agricultural landscapes; and

(f) Support monitoring in priority watersheds to quantify land use-water quality relationships, including conducting event based monitoring where feasible.

Result 1.2 – *Improved understanding of nutrient levels and environmental conditions that trigger nuisance and harmful algal blooms in the Great Lakes, with an emphasis on Lake Erie.*

Canada and Ontario will:

(a) Undertake water quality monitoring related to algae conditions in the Great Lakes; and

(b) Improve knowledge and understanding of the causal relationships between factors such as duration, intensity, frequency and timing of storms; aquatic invasive species; land use and management; hydrological processes; internal nutrient cycling; hypoxia and harmful and nuisance algal production in the Great Lakes.

Ontario will:

(c) Support monitoring, research and modelling activities designed to understand past and present coastal processes, stresses and nearshore dynamics and to inform future actions in coast priority areas.

GOAL 2: ESTABLISH SCIENCE-BASED PHOSPHORUS CONCENTRATION AND LOADING TARGETS AND DEVELOP ACTION PLANS TO MANAGE THE TRANSPORT OF EXCESS NUTRIENTS FROM URBAN, AGRICULTURAL AND RURAL LANDSCAPES CONSISTENT WITH A HEALTHY GREAT LAKES ECOSYSTEM AND ECONOMY.

Result 2.1 – *Establishment of phosphorus concentration and loading targets for priority tributaries, nearshore and offshore waters of Lake Erie.*

Canada will lead, with Ontario's support:

(a) Review and revision of, as appropriate, existing nutrient and biotic indicators for aquatic ecosystem health to ensure that they support and measure progress towards the goals identified in this Annex;

(b) Development of integrated in-lake and watershed ecosystem models, taking climate change into consideration where relevant, to determine phosphorus load reduction targets for Canadian Lake Erie tributaries by 2016;

(c) Development of science-based phosphorus concentration and load reduction targets for selected Canadian tributaries and offshore waters of Lake Erie consistent with a healthy Great Lakes ecosystem by 2016;

(d) Development of science-based, nearshore targets that reflect the complexity of nearshore biological and physical processes and support a reduction in the severity and extent of harmful algal blooms and production of benthic algae by 2016;

(e) Synthesis of available aquatic nutrient science to guide phosphorus management planning and actions in the Great Lakes by 2016; and

(f) Engagement of the United States in establishing binational phosphorus concentrations and load reduction targets for Lake Erie by 2016 consistent with the Canada-United States Great Lakes Water Quality Agreement, including consultation with United States federal and state agencies, other federal departments, other provincial agencies, and the Great Lakes community.

Canada and Ontario will:

(g) Apply the knowledge gained in the development of targets for Lake Erie to an assessment of the need for revised targets for other Great Lakes and priority watersheds.

Canada will:

(h) Monitor and report on nutrient loadings in selected Canadian tributaries in the Lake Erie watershed in 2014 and 2015.

Result 2.2 – *Action plans to work towards meeting phosphorus concentration and loading targets for the Great Lakes, with an emphasis on Lake Erie.*

Canada and Ontario will:

(a) Assess existing programs, policies and legislation that contribute to managing excess phosphorus in the Great Lakes;

(b) Investigate the socio-economic benefits and costs to Great Lakes communities and industries of actions to minimize nuisance and harmful algal blooms; and

(c) Develop and begin implementation of a Canadian Phosphorus Management Strategy for Lake Erie by 2018 to increase nutrient use efficiency and reduce nuisance and harmful algal blooms.

Canada will lead, with Ontario's support:

(d) Participate in the development and implementation of phosphorus management plans for priority watersheds and/or key sectors in Lakes Erie, Huron and Ontario, including targets based on science and the Principle of Sustainability which considers environmental, economic and social factors.

GOAL 3: REDUCE EXCESS NUTRIENT LOADINGS TO THE GREAT LAKES RESULTING FROM STORMWATER AND WASTEWATER FROM URBAN AND RURAL COMMUNITIES.

Result 3.1 – *Reduction in excess nutrient loadings from stormwater and wastewater collection and treatment facilities in urban and rural communities.*

Canada and Ontario will:

(a) Identify and promote priority actions to assist municipalities to meet commitments in the Canada-United States Great Lakes Water Quality Agreement;

(b) Promote eligible investments that support the reduction of excess nutrients from point sources such as municipal wastewater treatment systems or municipal stormwater effluent as priority considerations under applicable infrastructure and other funding programs; and

(c) Undertake a review of options to align the collection and reporting of data to support science-based data analyses and provide robust and reliable information about nutrient loadings from regulated sewage treatment plants.

Canada will:

(d) Through the Lake Simcoe/South-eastern Georgian Bay Clean-Up Fund, support urban projects to reduce phosphorus inputs to South East Georgian Bay.

Ontario will:

(e) Provide funding support to eligible municipalities for water infrastructure asset management;

(f) Provide information and support to municipalities to foster the optimization of wastewater treatment plants;

(g) Improve tracking of sewage overflows and bypasses, and continue to monitor incidents and municipal actions to minimize them, as a means to encourage municipalities to complete and implement Pollution Prevention Control Plans and consider climate change vulnerabilities;

(h) Update Ontario's municipal wastewater policy and approvals process, including:
   i. policies specific to stormwater, green infrastructure, construction runoff and sediment management;
   ii. guidance to facilitate the uptake of innovative source control measures that reduce stormwater volumes and enhance resilience to climate change, such as green infrastructure and low impact development;
   iii. encouragement of the use of green infrastructure and low impact development early in municipal planning decisions, so that stormwater and climate change adaptation are considered as part of project design and approvals; and

(i) Monitor the performance and effectiveness of stormwater and green infrastructure projects and communicate the results.

GOAL 4: REDUCE EXCESS NUTRIENTS THROUGH IMPROVED EFFICIENCY OF NUTRIENT USE IN AGRICULTURAL PRODUCTION TO SUPPORT A HEALTHY GREAT LAKES ECOSYSTEM, CONSISTENT WITH A SUSTAINABLE AND COMPETITIVE AGRICULTURE SECTOR.

Result 4.1 – *Improved understanding and development of practices and technologies for nutrient use efficiency.*

Canada and Ontario will:

(a) Define, collect and analyze information about the current use of nutrients in selected agricultural landscapes and production systems; and

(b) Research and develop innovative approaches and technologies for improved nutrient and water management in agricultural production.

Ontario will:

(c) Test and investigate the efficacy of management practices at field and sub-watershed scales.

Result 4.2 – *Increased adoption of cost-effective practices and technologies to improve nutrient use efficiency and reduce the risk of loss of excess nutrients from agricultural production.*

Canada and Ontario will:

(a) Develop and implement programs and tools for the agri-food sector to raise awareness and increase adoption of environmental farm planning and beneficial management practices by providing educational opportunities, technical advice, and funding.

Canada will:

(b) Through the Lake Simcoe/South-eastern Georgian Bay Clean-Up Fund, support agricultural projects to reduce phosphorus inputs to South-eastern Georgian Bay.

Ontario will:

(c) Support demonstration projects to increase adoption of management practices in selected agricultural landscapes that increase nutrient use efficiency and reduce the risk of phosphorus losses; and

(d) Model the environmental and economic effects of beneficial management practices in pilot sub-watersheds, and monitor water quality change within sub-watersheds to verify models for continuous improvement.

ANNEX 2: HARMFUL POLLUTANTS

The purpose of this Annex is to guide cooperative and coordinated actions to reduce or eliminate releases of harmful pollutants into the Great Lakes basin.

For over 40 years, Canada and Ontario have been working together to reduce or eliminate the release of harmful pollutants into the Great Lakes basin.

Under the 1994 Canada-Ontario Agreement, specific harmful pollutants were targeted for action and identified as Tier I Substances (chemicals targeted for virtual elimination or zero discharge from sources within the Great Lakes as well as for global efforts to eliminate out-of-basin sources) and Tier II Substances (chemicals that had the potential for widespread impacts in the Great Lakes or were already causing local adverse impacts). There have been significant accomplishments in reducing the presence of a number of these in the Great Lakes basin, including a more than 90 percent reduction in Canadian releases of mercury, dioxins and furans, and a more than 90 percent reduction in the amount of high-level PCBs in storage in Ontario. The concentrations of these chemicals are significantly lower in the sediments, offshore waters and fish of the Great Lakes.

Notwithstanding these successes, further efforts may be required to better understand the potential impact of some of these chemicals on the Great Lakes ecosystem and, where appropriate, to undertake new or additional risk management actions. Also, there is a need to address many other chemicals that are used and released into the Great Lakes basin, which are known to or suspected to pose an increased risk to human health or the environment. For example, by 2006 the Government of Canada categorized approximately 23,000 chemicals in commerce, in order to identify the highest priorities for assessing potential risks to human health or the environment in Canada. Many of these chemicals are being used by the growing population of the Great Lakes region and are being released into the basin.

Canada and Ontario are actively engaged in programs and initiatives designed to assess and manage the risks posed by certain chemicals to human health and the environment. Federal initiatives include the Chemicals Management Plan (CMP), which assesses and manages the risks posed by chemicals in accordance with federal laws, including the *Canadian Environmental Protection Act, 1999*, the *Pest Control Products Act*, the *Canada Consumer Product Safety Act*, the *Food and Drugs Act* and the *Fisheries Act*. International efforts under the CMP, for example the Stockholm Convention on Persistent Organic Pollutants or the Convention on Long-Range Transboundary Air Pollution, can contribute to reductions of releases of Chemicals of Concern from out-of-basin sources that are deposited within the Great Lakes basin. Provincial initiatives aimed at protecting human health include the elimination of stand-alone coal-fired electricity generation by the end of 2014, local air quality regulations, the *Toxics Reduction Act, 2009* and a Toxics Reduction Strategy, which includes the banning of cosmetic pesticides.

This Annex contains commitments to complete a status report of chemicals identified as Tier I and Tier II substances; establish a Canada-Ontario Chemicals Management Committee; establish a process to identify Chemicals of Concern in the Great Lakes and to cooperate on specific research, monitoring, surveillance, and risk management actions for these Chemicals of Concern; and take actions to reduce risks and impacts from environmental emergencies and spills, and from stormwater and wastewater contaminant loadings.

GOAL 1: CONSISTENT WITH THE PRINCIPLES OF THIS AGREEMENT, COMPLETE A REVIEW OF CHEMICALS IDENTIFIED AS TIER I AND TIER II SUBSTANCES UNDER PREVIOUS AGREEMENTS BETWEEN CANADA AND ONTARIO RELATING TO THE GREAT LAKES AND CONTINUE TO IMPLEMENT MANAGEMENT ACTIONS IN THE GREAT LAKES.

Result 1.1 – *Report on past and current research, monitoring and risk management activities and achievements related to chemicals identified as Tier I and Tier II substances in previous Agreements between Canada and Ontario relating to the Great Lakes.*

Canada and Ontario will:

(a) Within six months of the Agreement coming into force, develop and finalize a status report summarizing past and current research, monitoring and risk management activities and achievements on chemicals identified as Tier I and Tier II.

Result 1.2 – *Consistent with the principles of the Agreement, continue to implement actions to manage Tier I and Tier II substances within the Great Lakes Basin Ecosystem.*

Canada and Ontario will:

(a) Continue to implement actions to manage Tier I and Tier II substances within the Great Lakes Basin Ecosystem; and

(b) Share with the Great Lakes community, through existing mechanisms, new information on the management of Tier I and Tier II substances.

Ontario will:

(c) Continue to work with municipalities and other agencies to increase diversion of materials containing Tier I and Tier II substances from the waste stream;

(d) Undertake compliance promotion strategies and implementation of standards and guidelines to further reduce Tier I and Tier II substances;

(e) Continue education and outreach initiatives and activities to reduce releases of legacy substances through the promotion of environmentally sound practices and pollution prevention measures; and

(f) Undertake additional projects to achieve reductions of legacy substances from both in-basin and out-of-basin sources. These projects include pollution prevention, voluntary agreements and best management practices.

GOAL 2: IDENTIFY CHEMICALS OF CONCERN IN THE GREAT LAKES BASIN AND UNDERTAKE ACTIONS, AS APPROPRIATE, TO REDUCE OR ELIMINATE THEIR USE AND RELEASE WITHIN AND INTO THE GREAT LAKES BASIN.

Result 2.1 – *A work plan is developed for achieving the goals, results and commitments set forth in this Annex as they pertain to chemicals.*

Canada and Ontario will:

(a) Within six months of this Agreement coming into force, establish a work plan and timelines to achieve the commitments for Chemicals of Concern. Components of this work plan will include: a process for identifying and designating Chemicals of Concern, including candidate binational chemicals of mutual concern; the preparation of the Canadian component of binational strategies for chemicals of mutual concern; taking actions, as appropriate, to address these chemicals; and reporting on Chemicals of Concern, binational strategies and associated activities.

Result 2.2 – *Chemicals of Concern are identified and periodically reviewed.*

Canada and Ontario will:

(a) Establish a process:
   i. By which each jurisdiction can nominate candidate chemicals for consideration as Chemicals of Concern under this Annex, which could include chemicals identified previously as Tier I and Tier II;
   ii. Under which, both jurisdictions reach agreement on identifying and designating Chemicals of Concern for priority action under this Annex;
   iii. By which Chemicals of Concern will be proposed, where appropriate, for nomination to the Canada-United States Chemicals of Mutual Concern Subcommittee of the binational Great Lakes Executive Committee; and
   iv. For conducting periodic reviews of currently designated Chemicals of Concern;

(b) Consistent with the principles of this Agreement, for each of their respective candidate Chemicals of Concern, provide supporting rationale for nominating the chemical as a Chemical of Concern, including but not limited to:
   i. Surveillance and monitoring data and/or other surrogate information (i.e., key industrial sectors and other sources of exposure) which indicates presence or a reasonable potential for presence in the Great Lakes and also any evidence that the chemical is having a demonstrated or likely detrimental impact on the Great Lakes;
   ii. An overview of historical and current pollution prevention and control actions; and
   iii. An identification of information and/or technology gaps;

(c) Agree to the designation of Chemicals of Concern for priority action in the Great Lakes basin. The first of these Chemicals of Concern shall be designated, at the latest, within two years of this Agreement entering into force;

(d) Determine those Chemicals of Concern for nomination to the Canada-United States Chemicals of Mutual Concern Subcommittee of the binational Great Lakes Executive Committee, as proposed binational chemicals of mutual concern;

(e) For those chemicals nominated by the United States for consideration as binational chemicals of mutual concern, consider whether to identify these as Chemicals of Concern under this Agreement; and

(f) Periodically review the identified Chemicals of Concern and any new federal or provincial candidate chemicals, to determine whether they should remain or be included, respectively, as priorities for action in the Great Lakes basin.

Canada will:

(g) Nominate Chemicals of Concern for action to the Canada-United States Chemicals of Mutual Concern Subcommittee of the binational Great Lakes Executive Committee, for consideration as binational chemicals of mutual concern.

Result 2.3 – *Releases of Chemicals of Concern are reduced or eliminated within the Great Lakes basin.*

Canada and Ontario will:

(a) Under their respective authorities, programs and strategies and in consultation with relevant sectors, as required, promote and support: life-cycle management; the use of safer chemical substances; best management practices and technologies which reduce or eliminate the use and release of Chemicals of Concern; and products containing Chemicals of Concern;

(b) Collaborate and coordinate, as appropriate, on activities to support reducing or eliminating the use and release of Chemicals of Concern and products containing Chemicals of Concern, using approaches that are accountable, adaptive and science-based;

(c) Where potential overlap exists between actions taken or proposed at both the federal and provincial levels, work in cooperation to minimize overlap and duplication, while maximizing environmental and health benefits;

(d) Periodically review and evaluate the progress and effectiveness of pollution prevention and control activities for Chemicals of Concern, adapting approaches as required;

(e) Cooperatively develop and implement the Canadian component of binational strategies for chemicals of mutual concern, where appropriate, as agreed to under the Canada-United States Great Lakes Water Quality Agreement; and

(f) Cooperatively review and evaluate progress towards implementing binational strategies for chemicals of mutual concern and adapt management approaches and other actions as required.

Canada will:

(g) Work with continental and other international governments to reduce or eliminate the deposition of transboundary Chemicals of Concern; and

(h) For pollution prevention or control measures implemented under the *Canadian Environmental Protection Act, 1999* or other federal Acts for Chemicals of Concern, deliver compliance promotion and enforcement actions as appropriate.

Ontario will:

(i) Support and enhance stewardship programs to improve waste diversion, take-back and proper disposal of harmful pollutants;

(j) Work with key sectors to develop, support and enhance programs and best management practices that reduce the release of Chemicals of Concern;

(k) Work with small and medium-sized enterprises, and others, who discharge to municipal sewer systems to reduce their inputs of Chemicals of Concern to these systems;

(l) Work with academia, industry, municipalities and stakeholders to promote the development of green technologies and activities supporting green chemistry;

(m) Enhance education and outreach on Chemicals of Concern in consumer products; and

(n) Engage Great Lakes communities, especially those that rely on fish as an important nutritional source for their diet, on reducing their potential exposure to Chemicals of Concern.

Result 2.4 – *Environmental quality criteria, which include guidelines, objectives, and/or standards, for Chemicals of Concern are established.*

Canada and Ontario will:

(a) Work together to develop environmental quality criteria for Chemicals of Concern, as required; and

(b) Review and address, as appropriate, exceedances of federal or Ontario or Canadian environmental quality criteria for Chemicals of Concern.

Canada will:

(c) Maintain, periodically review and make publically available a listing of current federal and Canadian environmental quality criteria for chemicals.

Ontario will:

(d) Develop technology-based standards to support reductions in emissions to air of provincial candidate Chemicals of Concern.

GOAL 3: ADVANCE KNOWLEDGE REGARDING CHEMICALS OF CONCERN FOR THE ENHANCEMENT OR DEVELOPMENT OF POLICIES AND PROGRAMS TO FURTHER REDUCE RELEASES AND MITIGATE RISKS.

Result 3.1 – *A Canada-Ontario Chemicals Management Committee is established to foster coordination and cooperation on the management of chemicals in the Great Lakes.*

Canada and Ontario will:

(a) Establish a Canada-Ontario Chemicals Management Committee responsible for the management of chemicals, including meeting all of the goals, results and commitments set forth in this Annex;

(b) Ensure there are strong linkages and open communication between the Canada-Ontario Chemicals Management Committee and the COA Executive Committee, and with other Great Lakes governance bodies that have a role in addressing Great Lakes issues, or that could have an impact on the commitments under this Annex;

(c) Share data on research, monitoring, surveillance, and related science activities and information on uses and releases that is collected under their respective chemicals management programs and strategies with each other and within the Great Lakes community, where appropriate;

(d) Facilitate the exchange of information including the sharing of confidential business information, as appropriate;

(e) Engage and draw on the expertise related to chemicals of the Great Lakes community as needed to achieve the goals of this Annex;

(f) Exchange information regularly on their respective public outreach activities, as appropriate, to ensure that information regarding chemicals and their management is effectively communicated to the public; and

(g) Cooperate on First Nations, Métis and stakeholder engagement activities, as appropriate, to ensure their participation in the implementation of chemicals management programs and activities.

Result 3.2 – *Research, surveillance and monitoring activities for Chemicals of Concern are delivered in a cooperative, coordinated and integrated fashion as appropriate.*

Canada and Ontario will:

(a) Under their respective authorities, programs and strategies, conduct coordinated research, monitoring and surveillance activities for Chemicals of Concern within the Great Lakes basin, which may include:
   i. Identifying and assessing the occurrences, sources, loadings, transport and impacts of Chemicals of Concern;
   ii. Evaluating the effect of Chemicals of Concern, and combinations thereof, on human and ecosystem health;
   iii. Coordinating research, monitoring and surveillance activities to provide early warning for chemicals which could become Chemicals of Concern;
   iv. Reviewing and prioritizing research needs on a regular basis, taking into account progress made; and
   v. Developing, improving and validating sampling and analytical tools, methods and techniques for the measurement of Chemicals of Concern that impact human and ecological health in the environment as well as evaluating their potential impacts.

GOAL 4: RISKS AND IMPACTS RESULTING FROM ENVIRONMENTAL EMERGENCIES AND SPILLS, AND FROM STORMWATER AND WASTEWATER CONTAMINANT LOADINGS ARE REDUCED.

Result 4.1 – *Joint spill prevention, preparedness, response and recovery efforts are strengthened.*

Canada and Ontario will:

(a) Continue to cooperate on activities to support the prevention of, preparedness for, response to and recovery from environmental emergencies and spills in the Great Lakes basin including:
   i. Ensuring effective plans and protocols are in place in order to provide clarity on roles and responsibilities;
   ii. Using spill trend data to identify key risk areas and shared emergency priorities;
   iii. Ensuring necessary training and relevant emergency exercises are undertaken; and
   iv. Ensuring effective communication and information sharing between emergency response agencies and affected communities;

(b) Review the recommendations in the 2012 Report entitled “Emergency Preparedness and Response Programs for Oil and Hazardous Materials Spills” from the Great Lakes Commission Emergency Preparedness Task Force and implement recommendations where appropriate and feasible; and

(c) Review the recommendations in the 2013 Canada-Ontario Great Lakes Spills Prevention and Response Review, and implement the recommendations where appropriate and feasible.

Result 4.2 – *Contaminant loadings from stormwater and wastewater collection and treatment facilities in urban and rural communities are reduced.*

Canada and Ontario will:

(a) Consistent with Lakewide Action and Management Plans (LAMPs), identify and promote priority actions for contaminants (emerging and conventional) and pathogens from wastewater treatment plants, urban and rural stormwater, rural domestic septic systems and other rural sources; and

(b) Promote eligible investments that support the reduction of contaminant and pathogen loadings as priority considerations under applicable infrastructure and other funding programs.

Ontario will:

(c) Undertake research to help determine the risks of exposure of pathogens from municipal wastewater effluent, combined sewer overflows (CSOs) and stormwater to bathers and to drinking water systems (e.g., better understanding of the levels of pathogens (including protozoa, virus) in effluent, CSOs and stormwater from different types of disinfection (e.g., chlorine, peracetic acid, ultraviolet, ozone));

(d) Update Ontario municipal wastewater policy, including policies specific to stormwater, CSOs, and pathogens and contaminants in treated effluent;

(e) Improve tracking of sewage overflows and bypasses, and continue to monitor incidents and municipal actions to minimize overflows and bypasses and achieve co-benefits of pathogen and contaminant reduction, as a means to encourage municipalities to complete and implement Pollution Prevention Control Plans;

(f) Monitor the performance and effectiveness of stormwater and green infrastructure projects and communicate results including any co-benefits for pathogen and contaminant reductions; and

(g) Explore research, monitoring and surveillance opportunities related to the management of at-source and upstream treatment technologies under their respective authorities to address harmful pollutants in wastewater effluents and residuals.

ANNEX 3: DISCHARGES FROM VESSELS

The purpose of this Annex is to ensure that discharges from vessels do not adversely impact the Great Lakes.

Under the Constitution of Canada, the federal Parliament has exclusive jurisdiction over navigation and shipping. Existing laws, regulations, regulatory programs, inspection protocols and enforcement regimes are designed to address threats to the Great Lakes from vessel discharges.

Discharges of polluting substances from vessels have been addressed under the Canada-United States Great Lakes Water Quality Agreement since it was first signed in 1972. Oil was originally the discharge of greatest concern. The introduction of the zebra mussel in 1988 focused attention on the potential for ships' ballast water discharges to introduce aquatic invasive species (AIS) into the Great Lakes.

The Canada-United States Great Lakes Water Quality Agreement includes commitments to protect the Great Lakes from the discharge of ballast water, oil, hazardous polluting substances, garbage, wastewater, sewage, AIS, pathogens, and antifouling systems.

The most recent binational report on Great Lakes water quality, presented to the International Joint Commission by Canada and the United States in April 2012, indicated that, with the exception of AIS found in ballast water, the impact on the Great Lakes from all of these discharges or potential discharges is low. Thanks to enhanced ballast water regulations introduced by Transport Canada, no new introductions of AIS to the Great Lakes have been attributed to ballast water since 2006.

This Annex includes actions to continue implementing existing ballast water and discharge requirements, to advance new treatment technologies and control measures for AIS, and to ensure that canals and waterways are considered in measures to prevent and control AIS. Additional provisions to address risks from AIS are included in the AIS Annex.

GOAL 1: IMPLEMENT CANADIAN BALLAST WATER REQUIREMENTS TO PROTECT THE GREAT LAKES FROM AIS.

Result 1.1 *– Continued implementation of the Ballast Water Control and Management Regulations under the Canada Shipping Act, 2001.*

Canada will:

(a) Continue to enforce the Ballast Water Control and Management Regulations to promote 100 percent compliance from vessels arriving in the Great Lakes from outside the Canadian exclusive economic zone.

GOAL 2: RESPECT CANADA'S INTERNATIONAL OBLIGATIONS BY ADVANCING ADDITIONAL TREATMENT TECHNOLOGIES AND CONTROL MEASURES TO FURTHER REDUCE THE RISK OF INTRODUCTION INTO OR SPREAD OF AIS IN THE GREAT LAKES.

Result 2.1 – *Reduction of the risk of introduction of AIS discharged by ships into the Great Lakes.*

Canada will:

(a) Implement the requirements of the International Convention for the Control and Management of Ship's Ballast Water and Sediments, 2004; and

(b) Research and develop additional practicable measures to further reduce the risk of introduction into or spread of AIS via ships within the Great Lakes.

GOAL 3: PROTECT THE GREAT LAKES FROM THE FOLLOWING HARMFUL DISCHARGES FROM VESSELS: OIL AND HAZARDOUS POLLUTING SUBSTANCES; GARBAGE; WASTEWATER AND SEWAGE; BIOFOULING; AND ANTIFOULING SYSTEMS.

Result 3.1 – *Continued efforts to ensure that discharges from vessels remain a low risk to the quality and protection of the Great Lakes.*

Canada will:

(a) Implement the requirements of Annex 5 (Discharges from Vessels) of the Canada-United States Great Lakes Water Quality Agreement through policy, regulations, research and enforcement actions.

GOAL 4: ENSURE THAT VECTORS OTHER THAN VESSELS ASSOCIATED WITH NAVIGATION AND SHIPPING, SUCH AS CANALS AND WATERWAYS, ARE CONSIDERED IN THE PREVENTION OR SPREAD OF AIS.

Result 4.1 – *Binational risk assessment of pathways and vectors of AIS.*

Canada will:

(a) Assist other departments as required in their research into other vectors of introduction of AIS involving navigation and shipping.

PRIORITY – IMPROVING WETLANDS, BEACHES AND COASTAL AREAS

This Priority focuses on restoring, protecting and conserving wetlands, beaches and other coastal areas of the Great Lakes. The Areas of Concern (AOCs) Annex includes initiatives to support the ongoing restoration of water quality and ecosystem health in designated areas of the Great Lakes. The Lakewide Management Annex includes commitments to update and implement Lakewide Action and Management Plans (LAMPs) for each of the four Canadian Great Lakes and their major river connecting systems, and to develop and commence implementation of an integrated nearshore framework.

ANNEX 4: AREAS OF CONCERN

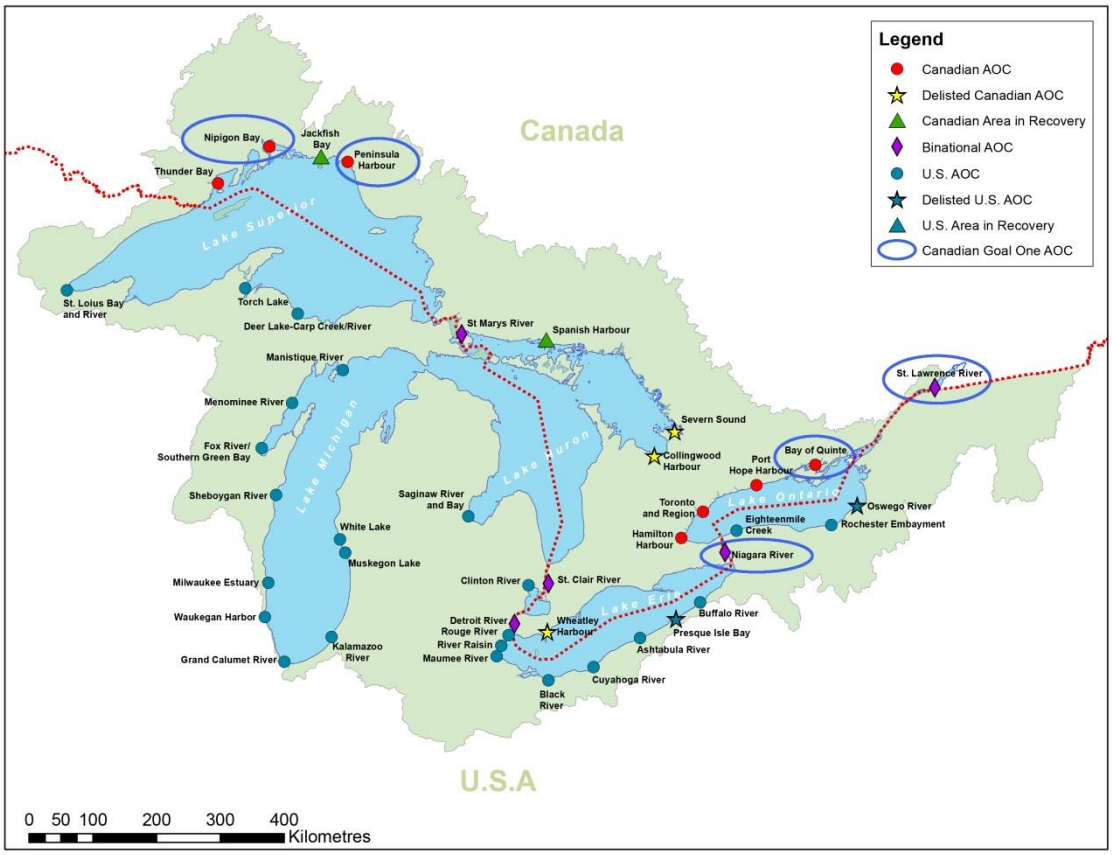
The purpose of this Annex is to restore water quality and ecosystem health in Areas of Concern.

Areas of Concern (AOCs) are geographic areas in the Great Lakes that were identified in the mid-1980s because water quality and ecosystem health had been severely degraded by human activities to the point that beneficial uses were impaired. Restoring these areas not only benefits the local community, it also contributes to improving water quality and ecosystem health throughout the Great Lakes. Forty-three locations were formally recognized as AOCs by Canada and the United States pursuant to the 1987 Protocol to the Canada-United States Great Lakes Water Quality Agreement: 12 in Canada, 26 in the United States and five binational AOCs that are shared by the two countries.

The environmental degradation within AOCs is primarily a legacy of the past caused by industrial activities, agriculture, urban and rural runoff, municipal wastewater effluents, land-use planning and practices on urban and rural lands. These past practices resulted in degraded water quality, contaminated river and lake sediment, and severely impacted fish and wildlife populations and habitats.

Working with community members and local governments, Canada and Ontario are implementing Remedial Action Plans (RAPs) to restore beneficial uses within the AOCs. Considerable progress has been made and, by 2010, three of the Canadian AOCs had been fully remediated and officially delisted (no longer deemed to be an AOC): Collingwood Harbour in 1994, Severn Sound in 2003, and Wheatley Harbour in 2010. Two additional Canadian AOCs have had all recommended remedial actions completed and have been recognized as being in recovery: Spanish Harbour in 1999 and Jackfish Bay in 2011. Environmental monitoring is continuing to confirm restoration of water quality and ecosystem processes.

In the remaining Canadian and binational AOCs, continued efforts are needed to complete implementation of the RAPs to restore ecosystem quality. This Annex includes initiatives that directly support the restoration and protection of environmental quality and beneficial uses in AOCs. This will contribute to the long-term goal of delisting the remaining AOCs and ensuring that environmental improvements achieved through the AOC process are sustained.



Map illustrating Great Lakes Areas of Concern

GOAL 1: COMPLETE PRIORITY ACTIONS FOR DELISTING IN FIVE AOCs: NIPIGON BAY, PENINSULA HARBOUR, NIAGARA RIVER, BAY OF QUINTE, AND ST. LAWRENCE RIVER (CORNWALL).

Result 1.1 – *Plans in place and being implemented to reduce microbial and other contaminants and excessive nutrients from industrial or municipal wastewater, stormwater and contaminated sites to achieve delisting targets in the Nipigon Bay, Peninsula Harbour, Niagara River, Bay of Quinte and St. Lawrence River (Cornwall) AOCs.*

Canada and Ontario will:

(a) Promote the reduction of microbial and other contaminants and excessive nutrients from urban stormwater sources in the Bay of Quinte by working with local governments, First Nations and stakeholders to identify preferred options to address stormwater controls and promote and monitor the completion of the planning for these facilities; and

(b) Promote and monitor upgrades to the Township of Red Rock's sewage treatment facility from primary to secondary treatment in the Nipigon Bay AOC.

Ontario will:

(c) Apply regulatory measures as appropriate to reduce the quantity and improve the quality of municipal and industrial wastewater in AOCs; and

(d) Continue its regulatory oversight to ensure measures are in place and are being implemented to reduce the migration of pollutants from contaminated municipal and industrial sites within the Nipigon Bay, Peninsula Harbour, Niagara River, Bay of Quinte, and St. Lawrence River (Cornwall) AOCs.

Result 1.2 – *Plans in place and being implemented to reduce microbial and other contaminants and excessive nutrients from urban and rural non-point sources to meet delisting criteria in the Bay of Quinte and Niagara River AOCs.*

Canada and Ontario will:

(a) Identify and promote the implementation of urban and rural non-point source priority actions for delisting in the Bay of Quinte and Niagara River AOCs by providing technical advice, workshops, education and outreach materials, and support for landowner contact programs, environmental stewardship projects and beneficial management practices; and

(b) Complete the development and promote implementation of the Bay of Quinte phosphorus reduction strategy based on the most up-to-date science and information.

Result 1.3 – *Implementation of contaminated sediment management strategies in the Niagara River, Bay of Quinte and St. Lawrence River (Cornwall) AOCs.*

Canada and Ontario will:

(a) Continue to implement the long-term sediment monitoring plan in the Niagara River AOC and the administrative controls for monitored natural recovery according to the Lyons Creek East Contaminated Sediment Strategy;

(b) Provide support as needed for the coordination of the Lyons Creek East Contaminated Sediment Strategy administrative controls;

(c) Continue to implement the Trent River Mouth administrative controls and associated long-term monitoring;

(d) Provide support as needed for the coordination of the Trent River Mouth administrative controls;

(e) Continue to monitor the contaminated sediment deposits along the Cornwall waterfront in accordance with the Cornwall Sediment Strategy monitoring plan;

(f) Continue to implement the Cornwall Sediment Strategy as outlined in the Cornwall Sediment Strategy Accord and Protocol (2005); and

(g) Provide support as appropriate for the coordination of the Cornwall Sediment Strategy administrative controls.

Result 1.4 – *Plans in place and being implemented to restore fish and wildlife habitats and populations to meet delisting targets in the Niagara River and Bay of Quinte AOCs.*

Canada and Ontario will:

(a) Support the completion of key actions to restore fish and wildlife habitats and populations identified in the 2010 Niagara River RAP Stage 2 Update report and complete the status assessment of fish populations; and

(b) Support the completion of key actions to restore fish habitats and populations identified in the Bay of Quinte Remedial Action Plan Stage 2 report and continue to promote the integration of the fish habitat management plan, fisheries management plan and the natural heritage strategy into municipal and regional official plans in the Bay of Quinte AOC.

Result 1.5 – *Informed, effective collaboration amongst governments and communities to prioritize and complete actions required for delisting and confirming environmental recovery in Nipigon Bay, Peninsula Harbour, Niagara River, Bay of Quinte and St. Lawrence River (Cornwall) AOCs.*

Canada and Ontario will:

(a) Consult with the community on the status of environmental recovery, completion of actions for delisting, and monitoring needs in the Nipigon Bay, Peninsula Harbour, Niagara River and Bay of Quinte AOCs;

(b) Support the activities of the Nipigon Bay, Peninsula Harbour, Niagara River and the Bay of Quinte RAP implementation teams to coordinate and implement projects, report on progress, facilitate community engagement and consultation, and promote adoption of mechanisms to sustain long-term environmental protection;

(c) Support the activities of public outreach and community groups involved in the communication and implementation of RAPs in the Nipigon Bay, Peninsula Harbour, Niagara River, Bay of Quinte and St. Lawrence River (Cornwall) AOCs; and

(d) Identify opportunities and mechanisms to communicate and collaborate with First Nations in AOCs during the process of delisting an AOC or designating it as an AOC in Recovery.

Result 1.6 *– Completion and implementation of long-term monitoring plans, assessments and environmental status reports.*

Canada and Ontario will:

(a) Finalize and implement monitoring plans to confirm status of impaired beneficial uses in the Nipigon Bay, Peninsula Harbour, Niagara River and Bay of Quinte AOCs;

(b) Complete assessments of beneficial use impairments and delisting or AOC in Recovery reports as appropriate for the Nipigon Bay, Peninsula Harbour, Niagara River and Bay of Quinte AOCs; and

(c) Complete the environmental status reports for the Nipigon Bay, Peninsula Harbour, Niagara River, Bay of Quinte and St. Lawrence River (Cornwall) AOCs and transmit the reports to the International Joint Commission for comment.

Ontario will:

(d) Implement the long-term monitoring program of Peninsula Harbour contaminated sediment.

GOAL 2: MAKE SIGNIFICANT PROGRESS TOWARDS REMEDIAL ACTION PLAN IMPLEMENTATION, ENVIRONMENTAL RECOVERY AND RESTORATION OF BENEFICIAL USES IN THE THUNDER BAY, ST. MARYS RIVER, ST. CLAIR RIVER, DETROIT RIVER, HAMILTON HARBOUR, TORONTO AND REGION, AND PORT HOPE AOCs.

Result 2.1 – *Plans in place and being implemented to reduce microbial and other contaminants and excessive nutrients from municipal sewage treatment plants, combined sewer overflows, urban stormwater and industrial wastewater to achieve delisting targets in the Thunder Bay, St. Marys River, St. Clair River, Detroit River, Hamilton Harbour, and Toronto and Region AOCs.*

Canada and Ontario will:

(a) Promote eligible investments that support the delisting of AOCs and improve the water quality of the Great Lakes as priority considerations under applicable infrastructure and other funding programs;

(b) Continue to promote and monitor implementation of priority actions related to sewage treatment plant upgrades in the Hamilton Harbour AOC;

(c) Continue to identify and promote implementation of the priority actions to address combined sewer overflows and stormwater management as appropriate in the Thunder Bay, St. Marys River, St. Clair River, Hamilton Harbour, and Toronto and Region AOCs;

(d) Continue to provide support to AOC municipalities, as appropriate, to:
    i. Research, develop and demonstrate potentially cost-effective approaches and technologies for stormwater management;
    ii. Prepare/update combined sewer overflow and stormwater management plans as appropriate in the Thunder Bay, St. Marys, Hamilton Harbour, and Toronto and Region AOCs; and
    iii. Conduct pre-implementation studies, such as environmental study reports, sustainable asset management plans, environmental management plans, and integrated watershed management plans, to prepare AOC municipalities to identify and address infrastructure requirements.

Ontario will:

(e) Apply regulatory, policy and voluntary measures as appropriate to reduce the quantity and improve the quality of municipal and industrial wastewater combined sewer overflows and stormwater in the Thunder Bay, St. Marys River, St. Clair River, Hamilton Harbour, and Toronto and Region AOCs;

(f) Track decommissioning of industrial facilities in the St. Clair River AOC to ensure RAP delisting targets are met; and

(g) Continue its regulatory oversight to ensure measures are in place and are being implemented to reduce the migration of pollutants from contaminated municipal and industrial sites within the Thunder Bay, St. Marys River, St. Clair River, Detroit River, Hamilton Harbour, and Toronto and Region AOCs.

Result 2.2 – *Plans in place and being implemented to reduce microbial and other contaminants and excessive nutrients from rural and urban non-point sources to achieve RAP delisting criteria in the St. Clair River, Hamilton Harbour, and Toronto and Region AOCs.*

Canada and Ontario will:

(a) Identify and support rural and urban non-point source priority actions for delisting in the St. Clair River, Hamilton Harbour, and Toronto and Region AOCs by:
    i. Working with local communities to collect and evaluate data and use tools such as models to determine and target priority areas for reductions to achieve delisting criteria;
    ii. Transferring technologies and information on best management practices on farms and rural properties;
    iii. Providing technical advice and outreach materials to promote awareness and stewardship initiatives regarding sources of non-point source contaminants and actions that reduce non-point source pollution;
    iv. Assisting landowners to access funding for projects that improve farm management practices; and
    v. Supporting environmental stewardship projects and application of best management practices.

Result 2.3 – *Progress in developing and implementing sediment management strategies to reduce ecological and human health risk from contaminated sediments in the Thunder Bay, St. Marys River, St. Clair River, Detroit River, Hamilton Harbour and Port Hope AOCs.*

Canada and Ontario will:

(a) Complete the development of contaminated sediment management strategies for the Thunder Bay (North Harbour site), St. Marys River (east of Bellevue Marine Park site) and St. Clair River AOCs;

(b) With the local community, begin implementation of the Randle Reef Contaminated Sediment Management Project in the Hamilton Harbour AOC;

(c) Provide technical support and advice for the characterization and development of sediment management strategies for contaminated slips in the Hamilton Harbour AOC;

(d) Undertake monitoring to confirm restoration of beneficial uses in areas where sediment remediation has been completed (Thunder Bay NOWPARC site, St. Clair River Zone 1 and Detroit River – Turkey Creek); and

(e) Develop a framework for monitored natural recovery.

Canada will:

(f) As part of the federal Port Hope Area Initiative, continue to lead the funding, planning, oversight and implementation of plans to address contaminated sediment in Port Hope Harbour.

Result 2.4 *– Development of long-term management plans and implementation of priority actions for rehabilitation and protection of fish and wildlife habitats and populations in St. Marys River, St. Clair River, Detroit River, Hamilton Harbour, and Toronto and Region AOCs.*

Canada and Ontario will:

(a) Make progress on fish and wildlife habitat protection and rehabilitation priority actions in the St. Marys River, St. Clair River, Hamilton Harbour, and Toronto and Region AOCs through collaboration and community involvement;

(b) Support the completion of key actions to restore fish and wildlife habitat and populations identified in the 2010 Detroit River RAP Stage 2 report; and

(c) Implement priority actions required for delisting the Toronto and Region and Hamilton Harbour AOCs as identified in fisheries management and natural heritage plans and strategies, such as the Toronto Waterfront Aquatic Habitat Restoration Strategy, and the Fish and Wildlife Habitat Project Plan for Hamilton Harbour.

Result 2.5 – *Informed, effective collaboration amongst governments, communities and individuals to prioritize and complete actions required for delisting and confirming environmental recovery in AOCs.*

Canada and Ontario will:

(a) Support existing local community RAP implementation groups in the St. Clair River, Detroit River, Hamilton Harbour, Thunder Bay, St. Marys River, and Toronto and Region AOCs;

(b) Provide information, opportunities and support for community input, consultation and participation on RAP projects and initiatives through education, outreach, workshops, technology transfer and funding;

(c) Collaborate with local community RAP implementation groups and the Great Lakes community, as needed, to prepare, update and publish RAP progress reports, beneficial use impairment status reports, and information materials, and to maintain current websites; and

(d) Identify opportunities and mechanisms to communicate and collaborate with First Nations in AOCs during the development and implementation of priority actions.

Result 2.6 *– Identification of monitoring needs and completion of studies to evaluate results to assess environmental recovery status and support advancement of remediation strategies and re-designation of beneficial uses from "impaired" or "requires further assessment" status to "not impaired" status.*

Canada and Ontario will:

(a) Review and revise/update delisting criteria as appropriate in the Thunder Bay, St. Marys River, and Toronto and Region AOCs;

(b) Develop and implement AOC specific monitoring plans to track progress toward environmental recovery and meeting delisting targets in consultation with AOC communities for the Thunder Bay, St. Marys River, Detroit River, St. Clair River, Hamilton Harbour and Toronto and Region AOCs. This will be accomplished through agency programs or by providing scientific, technical and funding support and collaborative arrangements with local organizations as required;

(c) Provide an updated report on the status of beneficial use impairments in the remaining twelve AOCs and the AOCs in Recovery by March 31, 2016; and

(d) Identify and promote science and remedial actions in the Goal 2 AOCs and in AOCs in Recovery with a target of increasing the number of beneficial use impairments re-designated as "not impaired" from 18 to 30.

GOAL 3: IMPLEMENT ENVIRONMENTAL MONITORING, MANAGEMENT MEASURES AND REPORTING IN DELISTED AOCs AND AOCs IN RECOVERY.

Result 3.1*– Implementation of the post-delisting or AOC in Recovery monitoring and reporting in the Jackfish Bay, Spanish Harbour, and Wheatley Harbour AOCs, consistent with delisting reports or AOC in Recovery requirements.*

Canada and Ontario will:

(a) Continue to monitor environmental conditions in Wheatley Harbour and report by March 31, 2016 on the results;

(b) Undertake contaminant exposure assessments for areas of contaminated sediment in Spanish Harbour as part of its AOC in Recovery Monitoring Plan;

(c) Implement post-delisting monitoring and reporting as may be required for delisted AOCs identified in Goal 1 of this Annex; and

(d) Continue to implement the Jackfish Bay AOC in Recovery Monitoring Plan.

ANNEX 5: LAKEWIDE MANAGEMENT

The purpose of this Annex is to advance restoration, protection and conservation of the Great Lakes through collaboration among jurisdictions domestically and binationally and with the Great Lakes community on a lake-by-lake basis.

Lakewide Action and Management Plans (LAMPs) provide a mechanism to assess and report on the state of the ecosystem, identify science and management priorities, conduct studies and outreach activities, and identify the need for and facilitate further action. The Canada-United States Great Lakes Water Quality Agreement outlines a commitment to update and implement LAMPs for each of the four Canadian Great Lakes including their major river systems of St. Marys, St. Clair, Detroit, Niagara and the international section of the St. Lawrence. It also contains commitments to develop Lake Ecosystem Objectives, a new nearshore framework, and consult and cooperate with the Great Lakes community to assess the status of each Great Lake and address environmental stressors on a lakewide scale.

The nearshore areas of the Great Lakes have great biological diversity, provide numerous benefits and are the focal point for human interaction with the Lakes but are also subject to tremendous human impact. The nearshore framework will provide a foundation for assessing and managing the nearshore including Great Lakes beaches. It will be science-based, consider sources of stress and potential stress, and will include monitoring and reporting.

This Annex builds on and supports existing and new initiatives in priority geographies in each Great Lake to help achieve ecosystem objectives and to address those lakewide and nearshore issues that can be best addressed on a lakewide scale. Commitments in other Annexes such as Nutrients, Areas of Concern, Habitat and Species, and Harmful Pollutants also support the objectives of this Annex.

The Great Lakes are Ontario's primary source of drinking water. This Annex includes commitments to further assess and address threats to sources of drinking water in connection with efforts under Ontario's *Clean Water Act, 2006* as well as through existing federal policies and programs. Commitments throughout the Agreement are augmented by ongoing federal and provincial programs such as the federal Contaminated Sites Action Plan, and provincial contaminated site remediation efforts.

GOAL 1: MANAGE LAKEWIDE ECOSYSTEM CONDITIONS AND THREATS

Result 1.1 *– The status of each of the Great Lakes, including the connecting river systems, is regularly assessed and reported, and issues best addressed on a lakewide scale are coordinated and implemented binationally through LAMPs and with domestic agencies and organizations.*

Canada will lead, with Ontario's support:

(a) Establishment of binational Lake Ecosystem Objectives by 2017 and continuing efforts to achieve existing targets in the interim;

(b) Assessment and reporting on the state of the waters (physical, chemical and biological attributes) and ecosystem health of each Canadian Great Lake and its connecting channels including current and future potential threats and trends;

(c) Identification of research, monitoring and other science priorities for the assessment of current and future potential threats to water quality and lake ecosystem health, including climate change, and for the identification of priorities to support management actions;

(d) Science and monitoring surveys, inventories, studies and outreach activities that support the above assessments and management actions;

(e) Identification and coordination of required actions by government agencies and the Great Lakes community to address priority threats to water quality and lake ecosystem health and the achievement of Lake Ecosystem Objectives;

(f) Canadian input to development and implementation of lake-specific binational strategies to address objectives and any current and future potential threats to water quality and lake ecosystem health that are judged to be best addressed on a lake-by-lake basis;

(g) Publication of LAMPs for each lake, on a five-year rotational basis such that LAMPs for Lakes Erie, Superior, Huron and Ontario will be completed by 2018; and

(h) The update of LAMPs after 2016 to include actions to implement the nearshore framework.

Result 1.2 *– The Great Lakes community is engaged in decision making and taking action to restore, protect and conserve the lakes and connecting rivers.*

Canada will lead, with Ontario's support:

(a) Engagement of the Great Lakes community in:
   i. Lake Ecosystem Objectives;
   ii. research, monitoring and other science priorities;
   iii. priorities for action, identifying and communicating opportunities for action, and undertaking action; and
   iv. identifying and implementing approaches to increase community engagement/involvement at the lake level for each lake.

GOAL 2: IMPROVED ECOLOGICAL HEALTH OF NEARSHORE AREAS THROUGH ASSESSMENT, IDENTIFICATION OF PRIORITY AREAS AND INTEGRATED MANAGEMENT, INCLUDING PREVENTION, RESTORATION AND PROTECTION.

Result 2.1 *– A Great Lakes nearshore framework, including beaches, is developed and implementation is initiated, in cooperation with the Great Lakes community.*

Canada will lead, with Ontario's support:

(a) Development of, in recognition of lessons learned from previous and ongoing nearshore and coastal initiatives, an integrated binational framework for Great Lakes nearshore assessment and management by 2016, followed by implementation. The framework will include:
   i. Assessment of the state of the Canadian nearshore of the Great Lakes;
   ii. Identification of nearshore areas that are or may become subject to high stress due to individual or cumulative impacts on the chemical, physical or biological integrity of those areas;
   iii. Identification of nearshore areas that are of high ecological value;
   iv. Identification of priority nearshore areas for prevention, restoration and protection at an appropriate scale to support management action; and
   v. Identification of stresses (including climate change), causes, sources of contamination, management targets (thresholds, objectives, etc.), management actions and implementation mechanisms for priority areas.

Ontario will:

(b) Identify priority areas using existing information and work with agencies and organizations to identify and support initiatives that will result in improvements to nearshore areas and provide examples of integrated management that can be used as models for future approaches to address nearshore issues.

GOAL 3: TAKE ACTION WITH THE GREAT LAKES COMMUNITY TO ADDRESS PRIORITY LAKEWIDE AND NEARSHORE ISSUES.

Result 3.1 *– Initiatives and lake-specific priority actions to address current and future threats to water quality and ecosystem health, including beach quality, and to achieve Lake Ecosystem Objectives, as identified through LAMPs and the nearshore framework.*

Canada and Ontario will:

(a) Take action for Lake Ontario through such initiatives as:
   i. Western Lake Ontario Collaborative;
   ii. Support of the Niagara River Toxics Management Plan including the secretariat, public engagement, Niagara River water quality and biomonitoring;

(b) Take action for Lake Erie through such initiatives as:
   i. Grand River Water Management Plan and Southern Grand Rehabilitation Initiative;
   ii. Thames River Water Management Plan and Clear Water Revival;
   iii. Western Lake Erie Watersheds Priority Natural Area Agreement;
   iv. Canadian Lake St. Clair Management Plan;

(c) Take action for Lake Huron through such initiatives as:
   i. Lake Huron Georgian Bay Framework for Community Action;
   ii. Healthy Lake Huron Clean Water, Clean Beaches Campaign (Southeast Shores);
   iii. Southern Georgian Bay Shoreline Management Plan;

(d) Take action for Lake Superior through such initiatives as:
   i. National Marine Conservation Area; and
   ii. Implementation and reporting on progress of the Lake Superior Zero Discharge Demonstration Program including the 2015 Chemical Milestones Report and a "lessons learned" analysis.

Result 3.2 *– Local efforts to improve public beach water quality and beach ecosystems.*

Canada will:

(a) Issue regular public reports on the number of days that beaches are open and safe for swimming at Great Lakes monitored beaches.

Ontario will:

(b) Enhance understanding of the causes of *E. coli* or other substances that reduce use of beaches;

(c) Promote the use of enhanced beach management tools;

(d) Review the *E. coli* standard for bathing beach water quality; and

(e) Support community participation in beach stewardship, rejuvenation and education programs.

Result 3.3*– Ongoing research and monitoring to support nearshore and coastal-related decision making and to identify and understand emerging issues.*

Canada and Ontario will:

(a) In a manner consistent with binational commitments, and in collaboration with other Great Lakes agencies, support development and implementation of a nearshore framework.

Result 3.4 – *Potential risks to the Great Lakes as a source of safe drinking water are identified and assessed, and early actions to manage risks are undertaken.*

Canada will:

(a) Collaboratively pursue strengthening the protection of the Great Lakes as a source of safe drinking water through existing binational mechanisms; and

(b) Implement federal policies and programs that are protective of the Great Lakes as a source of safe drinking water.

Ontario will:

(c) Identify sensitive areas and mitigate risks to drinking water;

(d) Provide available datasets, studies and expertise to support the identification and assessment of issues and threats to drinking water sources; and

(e) Maintain and/or develop programs to provide education and outreach on the protection of drinking water sources, and to identify/support action to mitigate potential threats to source water.

Result 3.5 *– Improved understanding and implementation of adaptive management approaches to lake level regulation.*

Canada and Ontario will:

(a) Enhance understanding of the water budget within the Great Lakes basin, including lake supply, precipitation, evaporation, and watershed runoff, and factors that contribute to changing lake levels and the relationship with other natural lakes;

(b) Explore opportunities to collaborate on lake level adaptive management strategies as they relate to water quality and ecosystem health; and

(c) Consider adaptive management plans proposed by the International Joint Commission for the Upper Great Lakes and the Lake Ontario-St. Lawrence River system.

Ontario will:

(d) Improve understanding of cumulative impacts of water withdrawals, diversions, and consumptive uses on the water resources and ecosystems of the Great Lakes basin;

(e) Produce and maintain base mapping information products to be used by the Great Lakes scientific and policy development communities, such as elevation, hydrology features, wetlands, roads and multi-date/multi-resolution ortho-images; and

(f) Produce and maintain water use data and make them accessible to water management agencies across the Great Lakes basin.

PRIORITY – PROTECTING HABITAT AND SPECIES

This Priority focuses on restoring, protecting and conserving the natural habitats and biodiversity of the Great Lakes. Thriving habitats and native fish and wildlife communities contribute to the social and economic vitality of the Great Lakes basin. Unfortunately, many human activities put pressures on the ecosystem and result in the loss or degradation of habitats, fragmentation of natural systems, reductions in the health and abundance of native species, and threats from invasive species. To address these issues, this Priority includes Annexes on Aquatic Invasive Species (AIS) and Habitat and Species.

ANNEX 6: AQUATIC INVASIVE SPECIES

The purpose of this Annex is to ensure cooperative and coordinated efforts to reduce the threat of aquatic invasive species to Great Lakes water quality and ecosystem health.

Aquatic invasive species (AIS) have altered Great Lakes ecosystems and caused significant disruptions to many of the benefits those ecosystems provide to Canadians. The continued introduction of AIS is one of the most significant threats to biodiversity in the Great Lakes. They can degrade water quality by increasing suspended solids, concentrating toxins, and altering nutrient and energy flows within the food web. Zebra and quagga mussels trap nutrients in the nearshore zones of the Great Lakes, contributing to degraded water quality, algae development and deleterious impacts on fish and wildlife populations.

The Parties will provide leadership by working with all jurisdictions across the Great Lakes basin to develop effective rules and standards that can be practically applied by industry and the public, and that are consistent with rules and standards in other jurisdictions. They will continue to coordinate the implementation of the Canadian Action Plan to Address the Threat of Aquatic Invasive Species and the Ontario Invasive Species Strategic Plan, with a special focus on the priority actions for invasive species in the Great Lakes – prevention, detection, rapid response, management and adaptation.

Provincial regulations are in place prohibiting possession of live invasive fish species in Ontario, including live Asian carp. Coordinated efforts are being taken by several federal/provincial agencies and have resulted in a number of successful interceptions and prosecutions under these regulations. The prohibition of possession of live Asian Carp in other jurisdictions – the United States, Quebec, Manitoba, and British Columbia – provides further protection.

Sea lamprey control is a significant federal action that is critical to meeting fish community and ecosystem objectives for the Great Lakes. This program is the largest AIS control program in the world. It is delivered under the Great Lakes Fishery Convention by Canada (Department of Fisheries and Oceans) and the United States, through the Great Lakes Fishery Commission.

The recently incorporated Invasive Species Centre in Sault Ste. Marie is a new collaboration amongst the Ontario Ministry of Natural Resources and Forestry, Canadian Forest Service Branch of Natural Resources Canada, Canadian Food Inspection Agency, and Fisheries and Oceans Canada. It is a valuable new initiative to help achieve Agreement commitments on AIS.

This Annex includes goals and commitments to address ballast water, assess potential new AIS and AIS pathways, reduce the spread of existing AIS, and facilitate early detection and rapid response. Actions to prevent the introduction of AIS in the ballast water of ships are addressed in the Discharges from Vessels Annex of this Agreement.

GOAL 1: IMPLEMENT CONTROLS ON BALLAST WATER TO PROTECT GREAT LAKES ECOSYSTEMS FROM AIS.

Result 1.1 *– Continued implementation of Ballast Water Control and Management Regulations under the Canada Shipping Act, 2001 and the development of additional cost effective control measures to further reduce risk of introductions or intra-basin spread of AIS.*

Canada will:

(a) Continue enforcement of Ballast Water Control and Management Regulations to promote 100 percent compliance and meet international standards as described in Annex 5 of the Canada-United States Great Lakes Water Quality Agreement;

(b) Research and develop additional practicable measures to further reduce the risk of introduction into or spread of AIS via ships within the Great Lakes; and

(c) Carry out ecological assessments of the effectiveness of ballast water control efforts.

GOAL 2: IMPLEMENT PROGRAMS TO PREVENT THE INTRODUCTION, ESTABLISHMENT, AND SPREAD OF AIS AND TO CONTROL EXISTING AIS WHERE POSSIBLE.

Result 2.1 *– Binationally-coordinated risk assessments of potential new AIS and AIS pathways to inform prevention, monitoring, and control measures.*

Canada and Ontario will:

(a) Undertake biological and socio-economic risk assessments for potential new AIS, pathways and vectors identified as potential routes of entry. These risk assessments will be coordinated with management agencies from other Canadian or foreign jurisdictions where appropriate. Risk assessments of pathways of introduction may include: trade and/or importation of live organisms for live food markets, aquariums and gardens; use of bait; biological supply houses; recreation activities; and connecting waterways; and

(b) Develop improved understanding of the potential for movement of AIS through canals and waterways and implement programs to prevent the introduction and spread of AIS through intra-basin connections.

Result 2.2 *– Regulations and/or management strategies, informed by risk assessments, to help prevent new and potential invaders, such as Asian carp, and to reduce the spread of AIS.*

Canada and Ontario will:

(a) Assess and, where necessary, take steps to update applicable federal and/or provincial legislation, regulations and policies to prevent the introduction and establishment of new AIS and ensure clear accountability of agencies;

(b) Continue to develop binational, national and provincial plans for prevention, early detection and rapid response to AIS on basin-wide scales or at smaller scales as appropriate (e.g., Lake Superior Aquatic Invasive Species Complete Prevention Plan); and

(c) Continue joint enforcement efforts of existing regulations to prevent the introduction of AIS, such as Asian carp, to the Great Lakes basin through the live food-fish pathway and other pathways.

Result 2.3 *– Effective control of sea lamprey resulting in suppression of their populations to target levels that support fish community objectives in all Great Lakes.*

Canada will:

(a) Implement the sea lamprey control program in cooperation with the United States as coordinated through the Great Lakes Fishery Commission to reduce sea lamprey abundance to target levels that support fish community objectives in all Great Lakes;

(b) Carry out research about sea lamprey control methods and population assessments to optimize decisions that target control efforts, select control methods, and evaluate program effectiveness; and

(c) Carry out research and development of alternatives to lampricides to deliver effective, integrated management of sea lamprey.

Result 2.4 – *Existing dams and new barriers are in place to effectively and economically prevent the spread of AIS while considering the needs of the broader ecosystem.*

Canada and Ontario will:

(a) Identify existing dams and barriers in need of maintenance or being considered for removal that would slow the spread of AIS. Evaluate positive and negative effects of these dams and where appropriate, use the best information and decision tools available to develop plans to reduce the spread of AIS;

(b) Identify potential new locations for dams and barriers that could be used to slow the spread of invasive species and consider the potential for the spread of AIS in the design of new dams and associated fishways; and

(c) Continue research and development of fishways that block sea lamprey and/or other AIS but allow movement of non-invasive fish and other organisms.

Result 2.5 *– Appropriate consideration of the potential to spread AIS during any transfer or use of water.*

Canada and Ontario will:

(a) Consider and mitigate the risk of spreading AIS when evaluating any transfer or use of water.

GOAL 3: DEVELOP COORDINATED PLANS FOR EARLY DETECTION AND RAPID RESPONSE INITIATIVES.

Result 3.1 *– Development of early detection and rapid response initiatives for Canadian waters, coordinated and complementary with United States domestic planning to create a basin-wide response framework.*

Canada and Ontario will:

(a) Within two years, jointly develop an early detection and rapid response framework for Canadian waters that is guided by risk assessments, involves all required jurisdictions and agencies, and includes the development and implementation of watch lists, detection programs, reporting protocols and coordinated institutional, science, and management responses for AIS;

(b) Coordinate these domestic early detection and rapid response frameworks with United States response plans to create a binational, basin-wide response framework to prevent the establishment of newly detected AIS; and

(c) Work with United States federal and state agencies through key mechanisms, such as the United States Asian Carp Regional Coordinating Committee, to coordinate prevention, surveillance and response actions for Asian carp.

GOAL 4: IMPROVE UNDERSTANDING AND TOOLS TO RESPOND TO AIS.

Result 4.1 *– Expanded use of new techniques in the early detection of high risk AIS at low levels of abundance in the Great Lakes and in potential pathways.*

Canada and Ontario will:

(a) Work with United States agencies to explore and expand the use of new techniques, including genetic techniques and rapid assessment technologies, to detect high risk AIS at low abundances in the Great Lakes and in other potential pathways including trade, commerce, and recreation.

Result 4.2 *– Improved understanding of the ecosystem impacts of new and established high risk AIS to support decision making about possible rapid response or control actions and, where control is not feasible, to support decisions about adaptation of resource and environmental management.*

Canada and Ontario will:

(a) Identify new AIS that pose the greatest threat and conduct research to assess the risks to Great Lakes basin ecosystems, food webs and native species from possible new invasions;

(b) Continue to develop and implement biological and socio-economic risk assessment tools to determine pathways and relative risks associated with new and existing AIS;

(c) Monitor and report on the status of established AIS and their impacts on Great Lakes food webs;

(d) Where AIS are established, and eradication is not feasible, develop mitigation and/or management actions for priority invasive species based on risk analyses that forecast the effectiveness and efficiency of such measures; and

(e) Develop adaptation strategies and tactics for established AIS to guide fisheries, resource, and environmental management in situations where eradication or management options are not feasible.

Result 4.3 *– Understanding the potential for new or expanded ranges of AIS in the Great Lakes as a result of climate change.*

Canada and Ontario will:

(a) Undertake research to identify potential changes in species distributions and risks of new AIS due to the effects of climate change in the Great Lakes basin and incorporate findings in risk analyses of new AIS and pathways.

GOAL 5: ENGAGE THE GREAT LAKES COMMUNITY REGARDING WAYS TO PREVENT, DETECT, RESPOND AND MANAGE AIS.

Result 5.1 *– Increased awareness and education to assist in preventing the spread of AIS and reporting new occurrences.*

Canada and Ontario will:

(a) Expand collaborative communications and outreach and continue to engage the Great Lakes community to prevent the introduction and spread of AIS via high risk pathways; and

(b) Collaborate with research forums such as the Invasive Species Centre, Canadian Aquatic Invasive Species Network, the Great Lakes Fishery Commission, and Great Lakes Commission to communicate new and emerging science regarding AIS.

ANNEX 7: HABITAT AND SPECIES

The purpose of this Annex is to continue efforts to restore, protect and conserve the resilience of Great Lakes native species and their habitats.

The Great Lakes support a rich diversity of fish, wildlife and plant species. Thriving habitats and native fish and wildlife communities contribute to the social and economic vitality of the Great Lakes region. Unfortunately, many human activities put pressures on the ecosystem and result in the loss or degradation of habitats, fragmentation of natural systems, threats from invasive species, and reductions in the health and abundance of native species.

Collaborative efforts are underway to restore, protect and conserve the diversity of habitats and species that make up the Great Lakes aquatic ecosystems while providing sustainable social, ecological and economic benefits.

Biodiversity Conservation Strategies identify actions needed to restore, protect and conserve the native biodiversity of each Great Lake. The most critical biodiversity threats and needs of each lake are determined through a binational, collaborative, science-based process. Strategies have been completed for Lake Huron and Lake Ontario. Implementation plans identify ecologically significant areas, with a primary role for Lakewide Action and Management Plans (LAMPs) to promote actions, report on progress, and identify resource needs to conserve these resources (see Lakewide Management Annex).

Canada and Ontario also support other strategic conservation planning initiatives such as natural heritage system planning, the National Framework for Canada's Network of Marine Protected Areas and the Great Lakes Wetlands Conservation Action Plan. Collaboration through the Great Lakes Fishery Commission facilitates international shared management of fisheries through mechanisms under the Joint Strategic Plan for Management of Great Lakes Fisheries. Canada and Ontario also cooperate on activities to ensure the effective protection and recovery of species at risk and their habitats in Ontario.

Invasive species represent a continued threat to native species and ecosystems, and are addressed in the Aquatic Invasive Species Annex. Climate change is resulting in changes to physical conditions in the Great Lakes, such as temperature, precipitation, ice coverage and water levels, which in turn affect habitats and species. Research and adaptation actions are included in the Climate Change Impacts Annex.

This Annex contains commitments to continue working on the completion and implementation of Biodiversity Conservation Strategies, supported by research and monitoring programs that investigate the threats to aquatic habitats and species, identify methods for threat mitigation, and prioritize opportunities for restoration. The Parties will continue to use existing reporting mechanisms (e.g., LAMPs) to report progress on the commitments in this Annex.

GOAL 1: RESTORE, PROTECT AND CONSERVE GREAT LAKES AQUATIC AND TERRESTRIAL HABITATS THAT SUPPORT AQUATIC DEPENDANT SPECIES.

Result 1.1 *– Identification of high quality habitats in need of protection, priority areas for restoration and habitat creation, and the most significant stressors to native species and habitats.*

Canada and Ontario will:

(a) In collaboration with United States agencies, complete binational Biodiversity Conservation Strategies for Lake Erie by 2014 and Lake Superior by 2015 through significant stakeholder engagement, analysis of ecosystem health information, and the identification of threats, priorities, targets and actions;

(b) In collaboration with United States agencies, establish priorities and plans for implementation of strategies for Lakes Huron, Superior and Erie and continue to implement strategy for Lake Ontario; and

(c) Develop a framework which may include protocols, classification systems and adaptive management decision support tools for the collection of baseline information to guide sustainable landscape conservation, conservation of biodiversity and to measure future progress towards a target of net habitat gain consistent with binational efforts.

Result 1.2 *– Protection, enhancement and/or restoration of populations of native species and degraded habitats.*

Canada and Ontario will:

(a) Continue implementation of Biodiversity Conservation Strategy priority actions for all Great Lakes, including progress on local and regional initiatives;

(b) Facilitate binational collaborative actions to reduce the loss of native species and habitats and make progress on rehabilitation of native species such as:
- Lake Superior: coaster brook trout, lake sturgeon and walleye;
- Lake Huron: lake sturgeon, lake trout and walleye;
- Lake Erie and Lake St. Clair: lake sturgeon and lake trout;
- Lake Ontario and St. Lawrence River: lake trout, Atlantic salmon, American eel, lake sturgeon; and
- Other key species to be identified.

(c) Implement and promote stewardship actions and beneficial management practices with landowners, community groups and environmental sector organizations on urban, industrial and rural lands that are linked to aquatic habitats and water quality in the Great Lakes watersheds and nearshore, coastal and riparian areas, consistent with government plans and strategies;

(d) Conserve and protect Great Lakes fish to help contribute to aquatic ecosystem health, the supply of wholesome fish for human consumption and provide recreational fishing opportunities;

(e) Implement actions to restore, protect and conserve habitats for Great Lakes waterfowl, waterbirds and shorebirds through the Eastern Habitat Joint Venture and the North American Bird Conservation Initiative, consistent with priorities identified in the North American Waterfowl Management Plan and Bird Conservation Region Strategies;

(f) Undertake and support research, monitoring and reporting on the status of Great Lakes biodiversity focusing on native fish, aquatic dependent wildlife, aquatic food webs and habitats;

(g) Conserve priority habitats using a variety of tools, including collaborative initiatives such as the Great Lakes Wetlands Conservation Action Plan and the Eastern Habitat Joint Venture; tax incentive programs such as the Ecological Gifts Program and the Conservation Land Tax Incentive Program; and stewardship programs such as the Habitat Stewardship Program for Species at Risk and the Species at Risk Stewardship Fund; and

(h) Undertake and support studies that investigate the functions and ecosystem services of wetlands including hydrology, water quality and quantity, phosphorus reduction capabilities, carbon sequestration, and fish and wildlife habitat.

Canada will:

(i) Finalize and begin implementation of a management plan for the Lake Superior National Marine Conservation Area; and

(j) Implement a fisheries protection program consistent with fisheries management objectives and Great Lakes planning.

Ontario will:

(k) Continue collaborative work with local Fisheries Management Zone Councils for domestic Great Lakes fisheries management.

Result 1.3 *– Promotion of informed and effective collaboration amongst governments and the Great Lakes community that will lead to actions that restore, protect and conserve the resilience of native species and habitats.*

Canada and Ontario will:

(a) Provide technical transfer opportunities such as workshops, extension materials and training to promote stewardship activities by the Great Lakes community, including landowners; and

(b) Promote stewardship activities by the Great Lakes community, including landowners, through national and provincial initiatives.

Ontario will:

(c) Develop and make available new and/or updated evaluations of wetlands within the Great Lakes basin, with a focus on coastal wetlands and other wetlands that influence the Great Lakes; and

(d) Develop and make available material, education and training programs to increase communication and raise awareness about tools to support land-use planning.

PRIORITY – ENHANCING UNDERSTANDING AND ADAPTATION

This Priority focuses on the coordination of science activities and the investigation of existing and emerging stressors, such as climate change impacts and the effects of groundwater on Great Lakes water quality and ecosystem health. These activities are essential to ensure that the best available scientific knowledge is used to improve understanding and management of the Great Lakes. They are addressed in Annexes on Groundwater Quality, Climate Change Impacts and Science.

ANNEX 8: GROUNDWATER QUALITY

The purpose of this Annex is to gain a better understanding of how groundwater influences Great Lakes water quality and ecosystem health, and to identify priority areas for future action.

Groundwater may represent as much as 50 percent of the water entering the Great Lakes, either directly (via groundwater discharge along the coasts) or indirectly (via discharge into rivers and streams that then discharge into the lakes). Groundwater-based contaminants and excessive nutrients can impair the quality of the waters of the Great Lakes, particularly the nearshore region, with potential effects on aquatic species and recreational waters.

Because groundwater is a potential source of contaminants and excessive nutrients and a pathway for transfer to the Great Lakes, groundwater quality is linked to the successful delivery of key commitments in other Annexes, including Areas of Concern, Lakewide Management, Harmful Pollutants, Nutrients, and Habitat and Species.

Some areas near the Great Lakes are known to have contaminated groundwater. In some cases, initiatives are underway to direct management and/or implement remediation actions in these locations. They include provincial contaminated site remediation efforts such as the Deloro Mine Site, and some of the work done through the Federal Contaminated Sites Action Plan, and the federal remediation of the Port Hope Area. These actions will protect or improve the water quality of the Great Lakes.

This Annex includes commitments to develop a binational state of Groundwater Science Report, create an interagency groundwater issues team, identify priorities for future research, and identify priority areas and sites for monitoring, management or remediation actions to address groundwater impacts and stressors.

GOAL 1: ENHANCE UNDERSTANDING OF GROUNDWATER TO SUPPORT THE IDENTIFICATION AND ASSESSMENT OF GROUNDWATER IMPACTS AND STRESSORS ON GREAT LAKES WATER QUALITY AND ECOSYSTEM HEALTH AND, IN TURN, SUPPORT CURRENT AND FUTURE MANAGEMENT ACTIONS AND DECISIONS.

Result 1.1 *– A binational Groundwater Science Report, based on collecting and compiling groundwater science findings, is developed and made available.*

Canada will lead, with Ontario's support:

(a) Development, in cooperation with the United States, of a binational state of Groundwater Science Report in 2015 synthesizing relevant and available groundwater science.

Result 1.2 *– Identification of priorities for groundwater science.*

Canada and Ontario will:

(a) Assemble technical and scientific expertise to:
   i. Assess the state of groundwater science as it pertains to implications for Great Lakes water quality and ecosystem health; and
   ii. Identify groundwater science priorities and information gaps.

GOAL 2: IDENTIFY OPPORTUNITIES FOR FUTURE ACTIONS TO MINIMIZE GROUNDWATER IMPACTS AND STRESSORS ON GREAT LAKES WATER QUALITY AND ECOSYSTEM HEALTH.

Result 2.1 *– Identification of priority areas and sites for the development of monitoring, management or remediation actions to address groundwater impacts and stressors on Great Lakes water quality and ecosystem health.*

Canada and Ontario will:

(a) Facilitate the coordination, sharing and exchange of information to identify priority sites or areas using, but not limited to, existing and available inventories, where point sources may impact water quality and ecosystem health of the Great Lakes; and

(b) Identify priority sites or areas where point sources may impact the water quality and ecosystem health of the Great Lakes, including nearshore areas.

ANNEX 9: CLIMATE CHANGE IMPACTS

The purpose of this Annex is to continue to build understanding of climate change impacts and advance the integration of this knowledge into Great Lakes adaptation strategies and management actions.

Climate change impacts are being observed in the Great Lakes. Some of the most evident impacts include warmer water, changing precipitation patterns, decreased ice coverage and increased lake evaporation.

Climate change can also affect physical, chemical and biological processes in the Great Lakes. For example, warmer water temperatures can result in increased algal blooms, changes to the rates of biological productivity, and effects on water quality; extremes in water levels pose significant risks to the Great Lakes including implications for water quality and ecosystem functions (see also the Nutrients and Lakewide Management Annexes); changes in precipitation patterns may affect shoreline processes and increase the concentration of nutrients, which may in turn increase harmful and nuisance algal blooms; and native fish and wildlife habitats, populations and diversity may be affected by changes to ecosystem functions and by new or expanded ranges of invasive species (see also the Aquatic Invasive Species Annex).

This Annex contains commitments that will improve our understanding of the effects of climate change on Great Lakes water quality and ecosystem health. Existing and future climate change impacts and vulnerabilities will be assessed in order to inform management plans and strategies and to help communities take actions to increase ecosystem resiliency to a changing climate. This Annex also outlines commitments that support communities in being better prepared to take action on climate change impacts and adaptation.

GOAL 1: ENHANCE KNOWLEDGE OF EXISTING AND FUTURE IMPACTS OF CLIMATE CHANGE IN RELATION TO THE GREAT LAKES.

Result 1.1 – *Improved understanding of climate change impacts in the Great Lakes.*

Canada and Ontario will:

(a) Maintain the monitoring of Great Lakes water level and streamflow predictions, via the cost-shared Ontario Hydrometric Network and binational work with United States agencies and States.

Canada will:

(b) Maintain the monitoring of climate and weather variables, such as wind, temperature, precipitation, evaporation, wave height, water temperature, and ice cover;

(c) Carry out research and modeling, and collaborate with others to improve regional scale climate model projections of climate change elements such as air and water temperature, wind speeds, ice, humidity, streamflow, precipitation frequency, duration and intensity, seasonal shifts, etc., where feasible; and

(d) Improve understanding of climate trends and variations and their effects on physical, chemical and biological processes affecting the Great Lakes.

Ontario will lead, with Canada's support:

(e) Ongoing operations of existing integrated monitoring stations.

Ontario will:

(f) Maintain the Provincial (Stream) Water Quality Monitoring Network for streams in the Great Lakes basin.

GOAL 2: SHARE INFORMATION ABOUT CLIMATE CHANGE IMPACTS, ADVANCE THE INTEGRATION OF THIS INFORMATION INTO GREAT LAKES MANAGEMENT STRATEGIES AND PROMOTE ADAPTATION ACTIONS.

Result 2.1 – *Assessment of existing and future climate change impacts and vulnerabilities of the Great Lakes to inform adaptive management actions.*

Canada and Ontario will:

(a) Consider climate change impacts and changing climatic conditions in the development of management strategies and action plans under the Agreement; and

(b) Provide support for the development and implementation of regional Great Lakes adaptive management initiatives and pilot projects with a focus on impacts to Great

Lakes water quality and ecosystem health, including initiatives related to lake level uncertainties, vulnerabilities and risks.

Canada will:

(c) Improve regional scale models and analytical tools (e.g., Intensity Duration and Frequency or IDF curves) in order to increase understanding of the risks, vulnerabilities and opportunities associated with climate change impacts to the Great Lakes.

(d) Complete risk analyses of the effects of projected changes in climate on elements of aquatic ecosystems to identify and describe ecosystem vulnerabilities and opportunities.

Result 2.2 – *Provision of climate change information to the Great Lakes community, including decision-makers and resource managers.*

Canada and Ontario will:

(a) Share climate and climate change impact-related data and information, including regional scale climate model outputs and research results, having implications for climate change impacts on Great Lakes water quality and ecosystem health with Great Lakes agencies, organizations and communities;

(b) Communicate ongoing developments in science, strategies and actions to address climate change impacts within the Great Lakes; and

(c) Share data and expertise on water levels and water budgets of the Great Lakes, where feasible, as they relate to Great Lakes water quality and ecosystem health in order to promote the understanding of the impacts of climate change and advance action on climate change adaptation.

Result 2.3 – *Communities are better prepared to take action on climate change impacts and adaptation.*

Ontario will:

(a) Work with others to promote the use of adaptive management tools that consider climate change impacts in the Great Lakes basin;

(b) Conduct a pilot vulnerability assessment of the impacts of climate change on a municipal water treatment plant in southern Ontario;

(c) Undertake an economic study to identify and quantify the economic impacts (including both challenges and opportunities) of climate change;

(d) Continue to implement adaptation actions important to communities across the province, including:

i. Building climate change adaptation into infrastructure planning processes;
ii. Completing guidance for integrating climate change impacts into the Environmental Assessment process;
iii. Continuing to share best practices and lessons learned with communities to promote water conservation;
iv. Continuing to provide community outreach and training to practitioners; and
v. Continuing to raise awareness with public health units and others about health risk factors associated with climate change.

ANNEX 10: SCIENCE

The purpose of this Annex is to enhance the effectiveness and efficiency of Great Lakes science activities through planning, cooperation, coordination and communication.

Science is the basis for shared understanding of the chemical, physical and biological integrity of the Great Lakes, and for ensuring effective decision making and actions. Science in the context of this Agreement includes monitoring, surveillance, observing, research, and modeling. Scientific information is used for effective decision making and for reporting on the conditions and progress in achieving environmental objectives and defining appropriate and necessary actions.

Science undertaken in support of the Agreement must be coordinated, integrated, synthesized, shared, reported and effectively communicated in order to efficiently provide the Great Lakes community with the information required to restore, protect and conserve the Great Lakes.

Government and non-government organizations and individuals routinely collect and analyze data pertaining to the state of the Great Lakes ecosystem. A suite of binational, science-based indicators is used to report regularly on conditions and trends. This information will be shared with the Great Lakes community including resource managers and decision-makers to ensure that decisions are being made using the best available science.

This Annex contains commitments to review current Great Lakes science activities, compile current and planned science activities, and examine emerging issues in order to support an assessment of their comprehensiveness and identify any needs for additional science efforts. Opportunities will be explored to enhance integration of different types of knowledge including traditional knowledge contributed by First Nations and Métis. A five-year science activity summary (2014 –2019) will be developed to provide opportunities to better coordinate science efforts in support of management and policy decisions. Most of the science activities to meet these commitments will be undertaken through other Annexes.

GOAL 1: FOCUS SCIENCE ON PRIORITIES THAT SUPPORT DOMESTIC AND BINATIONAL GREAT LAKES MANAGEMENT AND POLICY DECISIONS.

Result 1.1 – *Identification of science priorities, along with the supporting science activities, to inform policy development and management actions to support the restoration, protection and conservation of the chemical, physical, and biological integrity of the Great Lakes.*

Canada and Ontario will:

(a) Develop and maintain a multi-year Canada-Ontario Great Lakes Science Activity Summary in 2014/15 to assist in the coordination of scientific efforts under this Agreement. This Activity Summary will include:
   i. An inventory of relevant current and planned science conducted by the governments of Canada and Ontario; and
   ii. An assessment of the science needed for the delivery of the Agreement.

(b) Undertake targeted, issue-specific reviews and assessments of key threats and emerging issues of concern to the Great Lakes as required;

(c) Update science priorities triennially, for review by the Executive Committee established by this Agreement;

(d) Conduct, maintain and focus research programs to respond to science priorities and in order to promote research synergies to the greatest extent possible among Great Lakes government and non-government organizations; and

(e) Work with the Great Lakes community and the United States to identify binational science priorities triennially, taking into account the findings of the science information needs compilation, and the priorities identified by Canada-United States Water Quality Agreement Annexes, Ontario's Great Lakes Strategy, the Great Lakes Fisheries Commission and the International Joint Commission.

Result 1.2 – *Coordinated science activities by Canada, Ontario and others to support the identified science priorities to restore, protect and conserve Great Lakes water quality and ecosystem health.*

Canada and Ontario will:

(a) Work with the United States and others to support a binational Cooperative Science and Monitoring Initiative (CSMI) for Lakes Superior, Huron, Erie and Ontario and Lake Michigan for the United States on a five-year rotational basis, coordinating activities that are focused on science priorities identified through the LAMPs; and

(b) Ensure necessary agreements are in place for the timely and effective exchange of data and information.

GOAL 2: UNDERTAKE REGULAR ASSESSMENTS AND REPORT ON CONDITIONS AND TRENDS OF THE GREAT LAKES.

Result 2.1 – *Assessment of the state of the Great Lakes using science-based ecosystem indicators.*

Canada and Ontario will:

(a) Support indicator development, provide data and prepare indicator reports where applicable and encourage other Great Lakes government and non-government organizations to do the same.

Canada will lead, with Ontario's support:

(b) Establish and maintain a suite of comprehensive, science-based ecosystem indicators to assess the state of the Great Lakes, anticipate threats and measure progress against the general and specific objectives of the Canada-United States Great Lakes Water Quality Agreement.

Result 2.2 *– Regular public reports on the state of the Great Lakes.*

Canada and Ontario will:

(a) Share Great Lakes data and information through existing means such as established fora, social media, agency websites and reports as well as investigate new opportunities to efficiently convey information on trends in Great Lakes water quality and ecosystem health.

Canada will lead, with Ontario's support:

(b) Develop a comprehensive binational assessment of the Great Lakes ecosystem based on agreed-upon environmental indicators.

PRIORITY – PROMOTING INNOVATION AND ENGAGING COMMUNITIES

This Priority focuses on creating opportunities for communities to benefit from innovations in environmentally sustainable economic activities and to become involved in the restoration, protection and conservation of the Great Lakes. The Great Lakes provide numerous benefits to the social and economic well-being of the people who live along their shores and in the watersheds. Four Annexes address ways to increase and sustain these benefits: Promoting Innovation, Engaging Communities, Engaging First Nations and Engaging Métis.

ANNEX 11: PROMOTING INNOVATION

The purpose of this Annex is to create long-term, environmentally sustainable economic opportunities that improve water quality and ecological health and contribute to the well-being of the Great Lakes community.

Ongoing support for water quality and ecosystem protection in the Great Lakes will require public understanding of the local and regional business cases for environmental protection and a long-term commitment to seek new and efficient ways of delivering it.

By promoting innovative practices and technologies to keep our lakes clean and healthy, we can continue to enjoy the many benefits and prosperity they bring for generations to come. At the same time, as the global demand for water-related technology increases, Great Lakes restoration can also play a role in generating jobs and prosperity through the development of marketable water innovations.

The Great Lakes are a natural tourist destination for domestic and international visitors. Each year thousands of people experience an incredible array of diverse landscapes, including the region's National and Provincial Parks. The Great Lakes form a natural setting for waterfront festivals, recreation activities and heritage attractions that strengthen communities, build local economies, and present opportunities for people to vacation close to home.

Canada (with the support of the Federal Economic Development Agency) and Ontario support the work of the Southern Ontario Water Consortium, which is creating a platform for research, demonstration and testing of water and wastewater technologies and services for local, national, and global markets.

The Ontario *Water Opportunities Act, 2010* together with Ontario's Water Sector Strategy and Ontario's Great Lakes Strategy, will help make Ontario a leader in water innovation. Currently, water and wastewater is the largest sub-sector of Ontario's environment industry, employing 22,000 people in high-paying jobs, generating $1.8 billion in sales. Ontario's Great Lakes basin contains 40 percent of the country's economic activity. Global opportunities in the water sector are significant, as the sector is estimated to be valued at USD $424 billion, doubling in size every 10 years. Ontario businesses have broad expertise, including ultraviolet disinfection, membrane filtration technology, leak detection and repair, and watershed management.

This Annex includes commitments to build capacity in the water and wastewater sector, enhance ecosystem goods and services, and encourage sustainable tourism and recreation opportunities. Opportunities to access and enjoy the Great Lakes will encourage more people to value them and support water quality protection, ultimately increasing the number of people engaged in lake stewardship.

GOAL 1: POSITION THE GREAT LAKES AS A HUB FOR NEW WATER AND WASTEWATER RESEARCH AND DEVELOPMENT, TECHNOLOGY INNOVATION, DEMONSTRATION AND COMMERCIALIZATION, AND USE INNOVATIVE TECHNOLOGIES TO ADDRESS OUTCOMES SUCH AS WATER CONSERVATION AND EFFICIENCY, NUTRIENT RECYCLING AND WATER QUALITY PROTECTION.

Result 1.1 – *The Great Lakes region becomes a key contributor in the growth of the water sector/market, and a global leader in applying innovative technologies, services and solutions to remedy environmental problems.*

Ontario will:

(a) Foster innovative research and development hubs, support demonstration and commercialization initiatives (e.g., Water TAP) to attract global research and development leaders to the Great Lakes region, and encourage companies to develop innovative solutions for local and international markets;

(b) Work with companies to commercialize their new technologies (e.g., by supporting demonstration initiatives such as Water TAP), and access markets, approvals, information or training related to commercialization and demonstration;

(c) Foster an environment where entrepreneurs can develop solutions for local and international markets by continuing to improve processes, approvals, information or training related to commercialization and demonstration;

(d) Identify opportunities to support pilot and demonstration projects that address identified provincial priorities (such as nutrient recovery, green infrastructure, low impact development, and managing nutrients, wastewater and stormwater) and encourage municipal, industrial and developer uptake of innovative technologies;

(e) Identify one or more international forums to showcase Great Lakes technology innovation and share lessons learned from various programs and projects, such as Showcasing Water Innovation; and

(f) Leverage Ontario's success protecting the Great Lakes when promoting Ontario's water sector and helping firms export to global markets.

GOAL 2: MAINTAIN OR ENHANCE THE CAPACITY OF THE GREAT LAKES TO PROVIDE ECOSYSTEM GOODS AND SERVICES FOR ONTARIANS TO ENJOY AND TO SUPPORT ENVIRONMENTALLY SUSTAINABLE ECONOMIC DEVELOPMENT.

Result 2.1 – *The Great Lakes community is more aware of the benefits of environmentally-sustainable economic development.*

Ontario will:

(a) Communicate information to the Great Lakes community on the economic benefits resulting from Great Lakes commitments; and

(b) Increase awareness and/or promote the use of new technologies, services and practices to improve sustainability in the water sector's growth and development.

Result 2.2 – *Economic growth linked to opportunities derived from sustainable tourism and recreation dependant on the Great Lakes.*

Ontario will:

(a) Identify opportunities for participation, linkages and efficiencies to better implement waterfront revitalization;

(b) Encourage increased public access to waterfront areas where possible, to enhance community and tourist appreciation for the Great Lakes;

(c) Continue to support waterfront festivals, sporting events and heritage attractions that build Great Lakes engagement and foster sustainable shoreline use;

(d) Continue to promote and support sustainable waterfront trail systems that link communities and support local economies around the Great Lakes through walking, cycling and other trail activities; and

(e) Work with the cruise ship industry to capitalise on and further enhance the Great Lakes cruising industry in order to attract more visitors and generate more economic activity.

ANNEX 12: ENGAGING COMMUNITIES

The purpose of this Annex is to provide opportunities for individuals and groups to enjoy and help take care of the Great Lakes.

The Great Lakes are an essential part of everyday life for the people that live along their shores and in the watersheds. They provide our drinking water, food and electricity, and moderate our climate. They provide recreation and tourism opportunities and connect us with our heritage. Their natural beauty nourishes our spirit. They are the economic backbone of Ontario. Ensuring that the Great Lakes are healthy, and that resources are managed sustainably, is of vital importance to both the lakes and the people who live and work here.

Despite the many benefits of living in the Great Lakes basin, many inhabitants are unaware of the connections among their activities, their quality of life and the health of the lakes. Everyone has a role to play in protecting, restoring and conserving the lakes through local actions. Increased use and enjoyment of the lakes through recreation, festivals and tourism will contribute to personal wellbeing while motivating individuals to get involved. Better information and enhanced education will support citizen action to protect the lakes and prevent new problems from arising. This Annex includes commitments to foster and enhance the appreciation and awareness of the Great Lakes by the Great Lakes community and the broader public.

Canada and Ontario have a range of initiatives to increase awareness and provide support for local community initiatives and will engage the Great Lakes community on a good governance basis. The Great Lakes community has long contributed to the restoration, protection and conservation of the lakes. This Annex seeks to continue these efforts and to include a broad range of Canadians in both dialogue and action, through a variety of activities from planning and priority setting to problem solving and stewardship.

GOAL 1: CREATE OPPORTUNITIES FOR PEOPLE TO CONNECT WITH THE GREAT LAKES AND PARTICIPATE IN THEIR RESTORATION, PROTECTION AND CONSERVATION.

Result 1.1 – *Opportunities to foster and enhance the appreciation and awareness of the Great Lakes by individuals within the Great Lakes community.*

Canada and Ontario will:

(a) Explore opportunities to work with the Great Lakes community to enhance awareness, appreciation and engagement.

Canada will:

(b) Raise awareness and appreciation of the Great Lakes through communication of the State of the Lakes reports, Lakewide Action and Management Plans (LAMPs) and other mechanisms; and

(c) Convene a binational Great Lakes Public Forum to discuss and receive comments on the state of the lakes and binational priorities for science and action.

Ontario will:

(d) Work with the Great Lakes community to develop and support events that celebrate and recognize the importance of the Great Lakes;

(e) Through available communication channels directed to the local community level, promote Great Lakes recreation opportunities, programs, issues, science and achievements;

(f) Explore and enhance collaboration within the Great Lakes community to develop and deliver Great Lakes education and outreach opportunities; and

(g) Help school boards, school administrators and teachers to become aware of opportunities to use the Great Lakes as a context for teaching and learning.

Result 1.2 – *Support for local community activities that restore, protect and conserve the Great Lakes.*

Canada will:

(a) Encourage and support community projects and initiatives to help restore, protect and conserve the Great Lakes through the delivery of the EcoAction Community Fund, Great Lakes Sustainability Fund for Areas of Concern, and the Lake Simcoe/South-eastern Georgian Bay Clean-Up Fund.

Ontario will:

(b) Encourage and support community projects to help restore, protect and conserve the ecological health of the Great Lakes through programs such as the Ontario Community Environment Fund, Ontario's Great Lakes Guardians Community Fund, and other programs as applicable.

GOAL 2: ENHANCE ENGAGEMENT BY THE GREAT LAKES COMMUNITY IN THE RESTORATION, PROTECTION AND CONSERVATION OF THE GREAT LAKES.

Result 2.1 – *Engagement of the Great Lakes community from across all sectors, in support of Great Lakes activities.*

Canada and Ontario will:

(a) Engage the Great Lakes community in Great Lakes priority setting and the delivery of Agreement commitments.

Ontario will:

(b) Support a broad-based stewardship alliance in collaboration with the Great Lakes community to enhance collaboration and support implementation of the Agreement; and

(c) Continue to work with the Great Lakes and St. Lawrence Cities Initiative under the Memorandum of Cooperation on the Great Lakes.

ANNEX 13: ENGAGING FIRST NATIONS

There are many First Nations communities within the Great Lakes basin. First Nations value their spiritual and cultural relationship to the waters of the Great Lakes. They contribute to the protection of Great Lakes water quality and ecosystem health through the wise use and management of land and water in their communities.

Canada and Ontario work with First Nations on a good governance basis on a wide range of environmental protection issues. Through this Agreement, there are numerous opportunities for First Nations, as members of the broader Great Lakes community, to participate in Great Lakes restoration, protection and conservation initiatives. The purpose of this Annex is to reflect the interests and important role of First Nations as participants in the restoration, protection and conservation of the Great Lakes. It will provide a framework for Canada and Ontario to engage First Nations during the implementation of this Agreement and to consider their traditional knowledge to assist in restoring, protecting and conserving Great Lakes water quality and ecosystem health.

This Annex supports commitments in the Canada-United States Great Lakes Water Quality Agreement and advances the environmental goals of Ontario's Great Lakes Strategy. Goals within this Annex are intended to continue collaboration, strengthen relationships and to pursue opportunities to protect the Great Lakes.

GOAL 1: COLLABORATE AND BUILD RELATIONSHIPS WITH FIRST NATIONS TO ASSIST IN RESTORING, PROTECTING AND CONSERVING GREAT LAKES WATER QUALITY AND ECOSYSTEM HEALTH.

Result 1.1 *– Opportunities to collaborate with First Nations in the delivery of this Agreement.*

Canada and Ontario will:

(a) Invite First Nations to meet annually with COA Executive Committee co-chairs to discuss Great Lakes issues, as well as priorities and actions planned to achieve COA goals.

(b) Invite First Nations to participate in existing engagement processes that help support Annex-specific issues including those related to harmful pollutants; Lakewide Action and Management Plans; Lake Ecosystem Objectives and a nearshore framework; phosphorus concentration and load reduction targets; Lake-specific Biodiversity Conservation Strategies; and in other issue-specific engagement processes that may arise during the implementation of this Agreement; and

(c) Identify opportunities and mechanisms to communicate and collaborate with First Nations in AOCs during the process of delisting an AOC or designating it as an AOC in Recovery, and during the development and implementation of priority actions.

Ontario will:

(d) Engage First Nation communities, especially those that rely on fish as an important nutritional source for their diet, on reducing their potential exposure to Chemicals of Concern; and

(e) Support capacity building to enable greater participation by First Nations organizations and communities in Great Lakes restoration, protection and conservation efforts in priority areas.

GOAL 2: ENHANCE UNDERSTANDING AND APPRECIATION FOR THE GREAT LAKES BY CONSIDERING TRADITIONAL KNOWLEDGE.

Result 2.1 *– Opportunities to collaborate with First Nations on traditional knowledge.*

Canada and Ontario will:

(a) Identify and support a pilot project or projects to demonstrate the use of traditional knowledge in contributing to understanding and addressing Great Lakes issues; and

(b) Promote a symposium on traditional knowledge and how it can be used to effectively support decision making on Great Lakes issues.

ANNEX 14: ENGAGING MÉTIS

Canada and Ontario work with Métis on a good governance basis on a wide range of environmental protection issues. Through this Agreement, there are numerous opportunities for Métis, as members of the broader Great Lakes community, to participate in Great Lakes restoration, protection and conservation initiatives. The purpose of this Annex is to reflect the interests and important role of Métis as participants in the restoration, protection and conservation of the Great Lakes. It will provide a framework for Canada and Ontario to engage Métis during the implementation of this Agreement and to consider their traditional knowledge to assist in restoring, protecting and conserving Great Lakes water quality and ecosystem health.

This Annex supports commitments in the Canada-United States Great Lakes Water Quality Agreement and advances the environmental goals of Ontario's Great Lakes Strategy. Goals within this Annex are intended to continue collaboration, strengthen relationships and to pursue opportunities to protect the Great Lakes.

GOAL 1: COLLABORATE AND BUILD RELATIONSHIPS WITH MÉTIS TO ASSIST IN RESTORING, PROTECTING AND CONSERVING GREAT LAKES WATER QUALITY AND ECOSYSTEM HEALTH.

Result 1.1 – *Opportunities to collaborate with Métis in the delivery of this Agreement.*

Canada and Ontario will:

(a) Invite Métis to meet annually with COA Executive Committee co-chairs to discuss Great Lakes issues, as well as priorities and actions planned to achieve COA goals;

(b) Invite Métis to participate in existing engagement processes that help support Annex-specific issues including those related to harmful pollutants; Lakewide Action and Management Plans; Lake Ecosystem Objectives and a nearshore framework; phosphorus concentration and load reduction targets; Lake-specific Biodiversity Conservation Strategies; and, in other issue-specific engagement processes that may arise during the implementation of this Agreement; and

(c) Identify and support a pilot project or projects to demonstrate the use of traditional knowledge in contributing to understanding and addressing Great Lakes issues.

